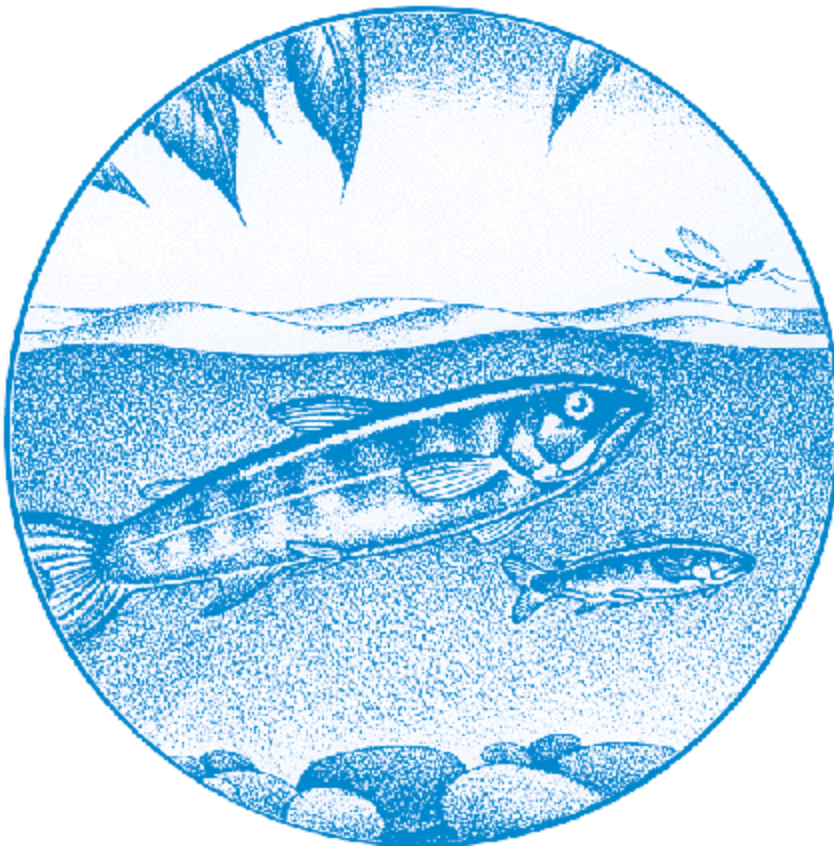


Smolt Monitoring at the Head of Lower Granite Reservoir and Lower Granite Dam

Smolt Monitoring by Federal and Non-Federal Entities

Annual Report
2000



DOE/BP-02117-6

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**SMOLT MONITORING AT THE HEAD OF LOWER GRANITE
RESERVOIR
AND LOWER GRANITE DAM**

**Annual Report
2000 Operations**

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**Smolt Monitoring by Federal & Non-Federal Agencies
Administered by Pacific States Marine Fisheries Commission**

**August 2002
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PREFACE

Project 8332300 addresses measure 5.9A.1 of the 1994 Northwest Power Planning Council Fish and Wildlife Program and the biological need to provide information on the migrating characteristics of the various stocks of salmon and steelhead within the Snake River basin. The National Marine Fisheries Service, which built and installed the traps on the Clearwater, Salmon, and Snake rivers, initiated this project in FY 1983. Idaho Department of Fish and Game assumed this work in 1984 and continues to operate traps as part of the annual coordinated Columbia and Snake River Smolt Monitoring Program. This effort provides field monitoring of smolt movement, marked groups of fish for reach survival estimates, as well as other environmental data necessary for water management decisions.

The management implications of this project include: 1) providing information on salmon and steelhead smolt movement at the upper end of the Snake River's series of dams; 2) providing groups of Passive Integrated Transponder-tagged fish, which are used for postseason survival estimates; and 3) application of this information to assist water managers for in-season management decisions relative to flow augmentation, facility power operations, fish collection and transportation programs, and operation of the Federal Columbia River Power System (FCRPS) to maximize benefits to smolt survival.

The following report presents results from the 2000 out-migration season and represents the 18th consecutive year of field monitoring in the Snake River system.

Listed below are other reports in this series that are available from Bonneville Power Administration, Division of Fish and Wildlife, P.O. Box 3621, Portland, Oregon 97208-3621.

Buettner, E. W., A. F. Brimmer, and S. A. Putnam. 2001. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1999 (LIB REF #D292; DOE/BP #11631-16) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631.

Buettner, E. W., and A. F. Brimmer. 2000. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1998 (LIB REF #D262; DOE/BP #11631-14) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631.

Buettner, E. W., and A. F. Brimmer. 1999. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1997 (LIB REF #D291; DOE/BP #11631-15) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631.

Buettner, E. W., and A. F. Brimmer. 1998. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1996 (LIB REF #D239; DOE/BP #11631-13) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 65P.

Buettner, E. W., and A. F. Brimmer. 1996. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1995 (LIB REF #D154; DOE/BP #11631-12) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 89P.

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- Buettner, E. W., and A. F. Brimmer. 1993. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1992 (LIB REF #D113; DOE/BP #11631-9) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 64P.
- Buettner, E. W. 1992. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1991 (LIB REF #D103; DOE/BP #11631-8) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 60P.
- Buettner, E. W., and V. L. Nelson. 1991. Smolt monitoring at the head of Lower Granite Reservoir and Lower Granite Dam. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1990 (LIB REF #D92; DOE/BP #11631-7) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 72P.
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- Scully, R. J., and E. W. Buettner. 1984. Smolt condition and timing of arrival at Lower Granite Reservoir. Idaho Department of Fish and Game, Boise, Idaho. Annual Report 1983 (LIB REF #D4; DOE/BP #253) to Bonneville Power Administration, Project 83-323B, Contract DE-B179-83BP11631. 87P.

ABSTRACT

This project monitored the daily passage of chinook salmon *Oncorhynchus tshawytscha*, steelhead trout *O. mykiss*, and sockeye salmon smolts *O. nerka* during the 2000 spring out-migration at migrant traps on the Snake River and Salmon River.

In 2000 the Nez Perce Tribe released significant numbers of hatchery chinook salmon and steelhead trout above Lower Granite Dam that were not marked with a fin clip or coded-wire tag. Generally, these fish were distinguishable from wild fish by the occurrence of fin erosion.

Total annual hatchery chinook salmon catch at the Snake River trap was 36% of the 1999 number. The wild chinook catch was 34% of the previous year's catch. Hatchery steelhead trout catch was 121% of 1999 numbers. Wild steelhead trout catch was 139% of 1999 numbers. The Snake River trap collected 689 age-0 chinook salmon. During 2000, the Snake River trap captured 40 hatchery and 92 wild/natural sockeye salmon and 159 hatchery coho salmon *O. kisutch*. Differences in trap catch between years are due to fluctuations not only in smolt production, but also differences in trap efficiency and duration of trap operation associated with high flows. Trap operations began on March 13 and were terminated for the season due to high flows on June 16. There were no down days due to high flows or debris.

Hatchery chinook salmon catch at the Salmon River trap was 96%, and wild chinook salmon catch was 66% of 1999 numbers. The hatchery steelhead trout collection in 2000 was 90% of the 1999 numbers. Wild steelhead trout collection in 2000 was 147% of the previous years catch. Trap operations began on March 13 and were terminated for the season due to high flows on May 22. There were no days where the trap was out of operation due to high flow or debris.

Travel time (d) and migration rate (km/d) through Lower Granite Reservoir for passive integrated transponder (PIT) tagged chinook salmon and steelhead trout, marked at the head of the reservoir, were affected by discharge. For fish tagged at the Snake River trap, statistical analysis of 2000 data detected a significant relation between migration rate and discharge. For hatchery and wild chinook salmon, there was a 3.0 and 16.2-fold increase in migration rate, respectively, between 50 and 100 kcfs. For hatchery steelhead, there was a 2.7-fold increase in migration rate, respectively, between 50 kcfs and 100 kcfs. The statistical analysis could not detect a significant relation between migration rate and discharge for wild steelhead in 2000.

For fish marked at the Salmon River trap, statistical analysis of the 2000 data detected a significant relation between migration rate and discharge for hatchery chinook salmon at the 0.05 level of significance and at the 0.1 level of significance for wild chinook salmon. Migration rate increased 3.2- and 1.9-fold, respectively, between 50 and 100 kcfs. For hatchery steelhead there was a 1.5-fold increase in migration rate between 50 kcfs and 100 kcfs. Insufficient numbers of wild steelhead trout were PIT tagged at the Salmon River trap to estimate travel time and migration rate to Lower Granite Dam.

Fish tagged with PIT tags at the Snake River trap were interrogated at four dams with PIT tag detection systems (Lower Granite, Little Goose, Lower Monumental, and McNary dams). Because of the addition of the fourth interrogation site (Lower Monumental) in 1993, cumulative interrogation data is not comparable with the prior five years (1988-1992). Cumulative interrogations at the four dams for fish marked at the Snake River trap were 57% for hatchery chinook, 65% for wild chinook, 73% for hatchery steelhead and 71% for wild

steelhead. Cumulative interrogations at the four dams for fish marked at the Salmon River trap were 53% for hatchery chinook, 64% for wild chinook salmon, 68% for hatchery steelhead trout, and 65% for wild steelhead trout.

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INTRODUCTION

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (P.L. 96-501) directed the Northwest Power Planning Council (NWPPC) to develop programs to mitigate for fish and wildlife losses on the Columbia River system resulting from hydroelectric projects. Section 4(h) of the Act explicitly gives the Bonneville Power Administration (BPA) the authority and responsibility to use its resources "to protect, mitigate, and enhance fish and wildlife to the extent affected by the development and operation of any hydroelectric project on the Columbia River system."

Water storage and regulation for hydroelectric generation severely reduces flows necessary for downstream migration of juvenile steelhead trout *Oncorhynchus mykiss* and chinook salmon *O. tshawytscha*. In response to the fishery agencies and Indian tribes recommendations for migration flows, the NWPPC Columbia River Basin Fish and Wildlife Program proposed a "water budget" for augmenting spring flows.

The federal Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 et seq.) listing of Snake River spring/summer and fall chinook salmon in 1992 and the development of a National Marine Fisheries Service (NMFS) Biological Opinion (BIOP) established flow measures for the Snake River. The measures within the BIOP establish flow targets and planning dates for providing those flows. The BIOP also requires monitoring and evaluation of the smolt out-migration. The NMFS established a Technical Management Team (TMT) to oversee implementation of the BIOP measures. The TMT utilizes out-migration monitoring data provided by the Idaho Department of Fish and Game (IDFG) through this project as a basis for implementing measures within the flexibility provided by the BIOP.

To provide information to the Fish Passage Center (FPC) for use by the TMT on smolt movement prior to arrival at the lower Snake River reservoirs, IDFG monitors the daily passage of smolts at the head of Lower Granite Reservoir. This information allows the FPC to request operations for fish passage to the TMT for implementation of BIOP measures to improve passage and migration conditions.

Smolt monitoring is a key component of BIOP implementation under all flow conditions and becomes critical when low flow conditions constrain BIOP measures and reduce migration rates. In years of low flow (drought years), knowledge of when most smolts have left tributaries and entered areas that can be affected by releases of stored water allows managers to make informed decisions regarding implementation of measures within the BIOP. Six low-flow years (1987, 1988, 1990, 1991, 1992, and 1994) have occurred during this smolt-monitoring project. The indications are that judicious use of the available reservoir storage volumes can greatly enhance the timing and migration rate of juvenile chinook salmon and steelhead trout.

The IDFG smolt monitoring project also collects other useful data on relative species composition, hatchery and wild steelhead trout ratios, travel time, and migration rate. All wild steelhead trout smolts are tagged with passive integrated transponder (PIT) tags to determine timing of wild adult steelhead trout one and two years later as they return to spawn (Prentice et al. 1987). By monitoring smolt passage at the head of Lower Granite Reservoir and at Lower Granite Dam, migration rates (km/d) under various riverine and reservoir conditions can be estimated and compared. It is possible to determine the relative abundance of hatchery and wild stocks of steelhead trout, which can be used to document wild stock rebuilding progress. This

Smolt Monitoring Program's information is complementary to other Snake and Columbia river NWPPC-supported projects.

OBJECTIVES

1. Provide daily trap catch data at the head of Lower Granite Reservoir for TMT's use in implementing the NMFS Biological Opinion.
2. Determine riverine travel time from the point of release to the smolt traps (index sites) at the upper end of Lower Granite Reservoir for PIT-tagged smolts.
3. Provide an interrogation site for PIT-tagged smolts, marked on other projects, at the end of their migration in a riverine environment and the beginning of their migration in a reservoir environment.
4. Determine reservoir travel time for hatchery spring/summer chinook salmon, wild spring/summer chinook salmon, hatchery steelhead trout, and wild steelhead trout from the head of Lower Granite Reservoir to Lower Granite Dam using PIT-tagged smolts marked at the traps and PIT-tagged smolts passing the traps from upriver hatchery releases and rearing areas.
5. Determine cumulative interrogation rate at Lower Granite, Little Goose, Lower Monumental, and McNary dams during the spring out-migration period for PIT-tagged hatchery and wild spring/summer chinook salmon, hatchery and wild steelhead trout.
6. Correlate smolt migration rate with river flow for fish moving in riverine and reservoir environments.
7. Determine trap efficiency for each species at each trap over a range of discharges.
8. Evaluate timing of returning adult wild and natural steelhead crossing Lower Granite Dam.

METHODS

Releases of Hatchery-Produced Smolts

Anadromous hatchery release information was reported for hatchery smolts that contributed to the 2000 out-migration in the Snake River drainage upstream of Lower Granite Dam. This information included species, number released, date, release location, number PIT tagged, and hatchery of origin. Not all hatchery-produced fish were fin clipped in 2000. The Nez Perce tribe released significant numbers of both hatchery chinook salmon and steelhead trout that were not fin clipped or coded-wire tagged in 2000.

Smolt Monitoring Traps

During the 2000 out-migration, two smolt-monitoring traps were operated to monitor the passage of juvenile chinook salmon and steelhead trout. A scoop trap (Raymond and Collins

1974) was located on the Salmon River, near Slate Creek, Idaho. A dipper trap (Mason 1966) was located on the Snake River near Lewiston, Idaho (Figure 1). In 1996, the Fish Passage Center requested that all smolt monitoring projects reduce handling of fish listed under the Endangered Species Act. To comply with this request, sampling regimes and PIT tag quotas were adjusted at this project's collection sites. Sampling periods were based on a standard work week (Monday-Friday) with Saturday and Sunday left available if necessary to fill weekly PIT-tag quotas. Weekly PIT-tag quotas for hatchery and wild chinook salmon were 600 each. Weekly PIT-tag quotas for hatchery and wild steelhead trout were 600 and 200, respectively. Smolts were captured, examined, and enumerated daily at the traps and released back to the river. Fork length of up to 100 smolts for each species, run, and rearing type was measured to the nearest millimeter daily. Up to 2,000 fish were examined daily for hatchery brands at the Snake River trap. Fish were not examined for brands at the Salmon River trap. Smolts were anesthetized before handling with tricaine methanesulfonate (MS-222) and allowed to recover before being returned to the river.

Water temperature (C°) and turbidity (m) were recorded daily at each trap using a centigrade thermometer and 20 cm Secchi disk. Snake River discharge was measured at the U.S. Geological Survey (USGS) Anatone gauge (#13334300), 44.4 km upstream from the Snake River trap. Salmon River discharge was measured at the USGS White Bird gauge (#13317000), 16.6 km downstream from the Salmon River trap.

Snake River Trap

The Snake River trap was positioned approximately 40 m downstream from the Interstate Bridge, between Lewiston, Idaho and Clarkston, Washington. The trap was attached to bridge piers just east of the drawbridge span by steel cables. This location is at the head of Lower Granite Reservoir, 0.5 km upstream from the convergence of the Snake and Clearwater arms. River width and depth at this location are approximately 260 m and 12 m, respectively.

Chinook salmon and steelhead trout smolts were PIT tagged at the Snake River trap to estimate travel time from the head of Lower Granite Reservoir to Lower Granite Dam. Median travel time of the daily PIT-tagged release groups was converted to migration rate. Migration rate was correlated with mean Lower Granite Reservoir inflow discharge for the number of days equal to the median travel time to determine how changes in discharge affected smolt migration rate through Lower Granite Reservoir.

Snake River trap operation began on March 13 and continued through June 16. The Snake River trap was out of operation for a total of zero days during the 2000 season due to mechanical failure, heavy debris loads, or because weekly PIT-tag quotas were reached. All fish captured in the Snake River trap were passively interrogated for PIT tags as they entered the live well. Interrogation and tagging information was sent daily to the PTAGIS Data Center (managed by Pacific States Marine Fisheries Commission).

The PIT tag interrogation system on the Snake River trap was converted to the new 134 kHz frequency this year. The interrogation system consists of an 8-inch PVC pipe with two interrogation coils (D-4 and D-6). Each coil is connected to an exciter card and a PIT-tag reader. Exact date and time of capture are recorded for each PIT-tagged fish. Coil efficiency tests were conducted on the dipper trap interrogation system. A total of 432 test tags were sent through the system. The reading efficiency was calculated to be 99% for both coils combined.

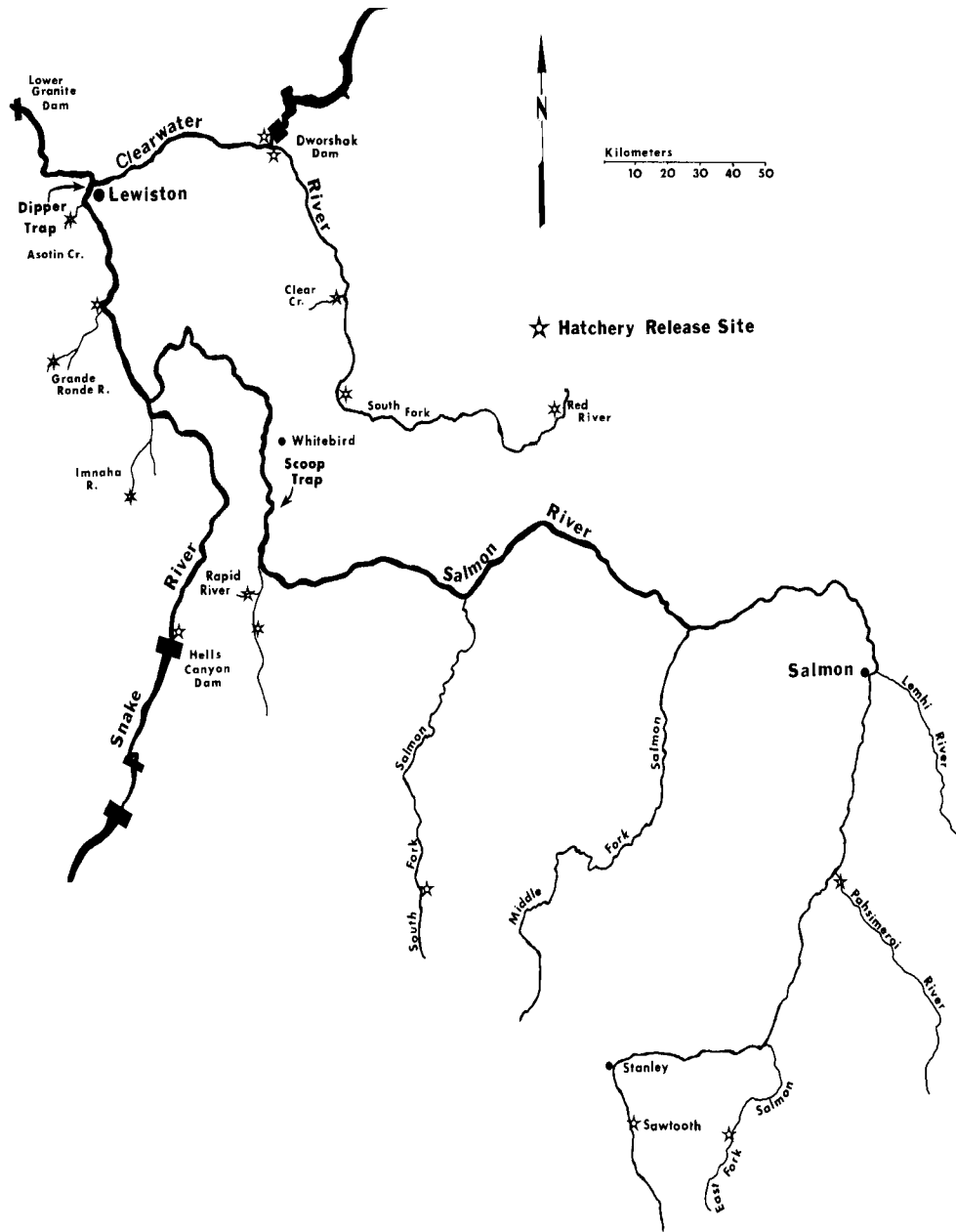


Figure 1. Map of study area.

Salmon River Trap

The Salmon River trap site was located at rkm 103, approximately 17 km upstream from the previous trapping location and 1.6 km downstream from Slate Creek. The scoop trap was operated immediately downstream of the upper U.S. Highway 95 bridge at Twin Bridges. This location was chosen to allow the trap to be operated through a wider range of discharge. River width at this location is approximately 90 m and varies with discharge.

Chinook salmon and steelhead trout juveniles were tagged with PIT tags at the Salmon River trap to estimate smolt travel time from the lower portion of the Salmon River to Lower Granite Dam. Median travel time for the daily PIT-tagged release groups was converted to migration rate. Migration rate was correlated with mean Lower Granite Reservoir inflow for the median travel time to determine how changes in discharge affected smolt migration rate through the Lower Salmon River and Lower Granite Reservoir.

Trap operation began on March 13 and continued through May 22 when operations were terminated for the season due to high water. Operations were suspended for zero days during the 2000 field season because weekly quotas had been reached or due to high discharge and/or mechanical failure. All fish were interrogated for PIT tags as they were removed from the live well. The tagging and interrogation files were sent to the PTAGIS Data Center daily.

The PIT tag interrogation system on the Salmon River trap was converted to the new 134 kHz frequency this year. The interrogation system consists of a 4-inch PVC pipe with two interrogation coils. Coil efficiency tests were conducted on the Salmon River trap interrogation system in 2000. Read efficiency was calculated to be 100% for both coils combined.

Trap Efficiency

Trap efficiency is the proportion of the migration run being sampled. Since trap efficiency may change as river discharge changes, efficiency has been estimated several times through the range of discharge at which the trap was operated. A linear regression equation (Ott 1977) describing the relation of trap efficiency and discharge was derived to estimate efficiency at any given discharge. During the 2000 trap operations, trap efficiencies were not calculated for any of the smolt traps. Previous trap efficiency estimates are reported in Buettner (1991).

Travel Time and Migration Rates

Migration statistics were calculated for hatchery release groups from release sites to traps. Travel time and migration rates to the traps were calculated using median arrival times at the Snake and Salmon River traps. Median arrival (or passage) date is the date the 50th percentile fish arrived at the trap or collection facility. Smolts were PIT tagged at the Snake River trap to determine travel time from the head of Lower Granite Reservoir to Lower Granite Dam. Smolts were PIT tagged at the Salmon River trap to determine migration rate in a free-flowing section of river plus Lower Granite Reservoir. Distances from release point to recovery location are listed in Table 1. Individual arrival times at the Lower Granite collection facility were determined for each daily release group. A minimum recapture number, sufficient for use in travel time and migration rate estimations, was derived from an empirical distribution function of the travel time for each individual release group (Steinhorst et al. 1988). If recapture numbers were less than five or less than the number derived from the empirical distribution function, the daily data were combined with another day's data or the data were not used. If they were combined, they were added to daily data from an adjacent release day that had similar discharge and travel time.

Smolt migration rate/discharge relations through Lower Granite Reservoir were investigated using linear regression analysis after both variables were stratified into 5 kcfs discharge intervals (Mosteller and Tukey 1977) and log (ln) transformed (Zar 1984). The 0.05 level was used to determine significance. This analysis was performed for the PIT-tagged

hatchery chinook salmon and wild chinook salmon, hatchery steelhead trout, and wild steelhead trout groups marked at the Snake or Salmon River traps.

Interrogation Rates of PIT-Tagged Fish

Interrogation rates of PIT-tagged fish marked at the head of Lower Granite Reservoir to Lower Granite Dam, Little Goose Dam, Lower Monumental, and McNary Dam collection facilities included data from 1988 to 2000 for the Snake River trap, 1989 to 1995 for the Clearwater River trap, and 1993 to 2000 for the Salmon River trap. The data have been examined to ensure that multiple interrogations within a dam and between dams have been removed.

RESULTS AND DISCUSSION

Hatchery Releases

Chinook Salmon

Chinook salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at seven locations in Idaho, two in Oregon, and one in Washington. A total of 9,445,107 chinook salmon smolts were released at 13 locations in Idaho, three locations in Oregon, and three locations in Washington during 2000 (Table 2). A total of 164,280 chinook salmon presmolts were released at two locations in Idaho during August 1999.

Steelhead Trout

Steelhead trout released into the Snake River drainage upstream of Lower Granite Dam were reared at five locations in Idaho, four locations in Oregon, and one location in Washington. A total of 9,765,783 steelhead trout were released at 28 locations in Idaho, five in Oregon, and one in Washington (Table 3). Fall releases of steelhead trout were not included in this report.

Sockeye and Coho Salmon

Hatchery coho salmon released into the Snake River drainage upstream of Lower Granite Dam were reared at one location in Idaho and one location in Washington. A total of 812,018 coho were released at three locations in Idaho (Table 4). Summer and fall releases of coho salmon have not been included in this report.

Hatchery sockeye salmon that contributed to the 2000 out-migration were reared at two locations in Idaho. A total of 13,103 sockeye were released at two locations in Idaho (Table 4). Summer and fall releases of hatchery sockeye salmon have not been included in this report.

Smolt Monitoring Traps

Snake River Trap Operation

The Snake River trap captured 5,566 hatchery, 2,214 wild, and 365 unknown rearing age-1 chinook salmon, 689 age-0 chinook salmon of unknown rearing, 8,777 hatchery and 1,364 wild steelhead trout, 40 hatchery and 92 unknown rearing sockeye/kokanee salmon, and 159 hatchery coho salmon in 2000 (Table 5).

Hatchery chinook salmon first arrived at the trap on March 14. Catch rates remained below 100 fish per day until April 14 when the daily catch reached 584. The catch dropped to 56 on April 19, but then remained above 102 until May 2 when it was 89 per day. After an increase to 329 on May 5, the daily catch remained below 58 until it reached 106 on May 23, after which the daily catch ranged from 106 to 259 until May 29. The daily catch remained below 88 fish per day until the end of the trap season on June 16 (Figure 2). About 1% (52) of the total season catch was captured in March, 58% (3,206) in April, 32% (1,797) in May, and 9% (511) in June.

Wild chinook salmon first arrived at the trap on March 16. Catch rates remained below 100 fish per day until April 10 when 134 fish were captured. The daily catch fluctuated between 39 and 330 until April 26. Then, less than 95 were caught per day through May 24. Other than 104 fish on May 25, 143 on May 29, and 50 on May 30, daily catch remained below eight until the end of the trap season on June 16. About 2% (38) of the total season catch was captured in March, 66% (1,467) in April, 31% (694) in May, and 1% (15) in June.

Physical characteristics were used to differentiate between age-0 chinook salmon and other chinook salmon. This year a total of 689 age-0 chinook salmon were captured. About 7% (51) of the season total was collected in March, 18% (126) in April, 56% (383) in May, and 19% (129) in June.

Hatchery steelhead trout first arrived at the trap on March 15. The daily catch remained below 100 until April 17 when 139 fish were captured. The daily catch ranged between 107 and 1,399 through May 12, except for 43 captures on April 19 and 28 on April 20. After May 12, daily counts were 90 or less until May 18 when 289 were caught. The daily catch then fluctuated between 27 and 240 until May 30 when the daily catch decreased to less than 21 through the end of the trap season on June 16 (Figure 3). Less than 1% (9) of the season total was collected in March, 46% (4,044) in April, 53% (4,667) in May, and 1% (57) in June.

Wild steelhead trout were first captured at the trap on March 15, but were not consistently seen until March 27 (Figure 3). The daily catch remained less than 100 per day through the end of the trap season on June 16, except for 102 fish captured on April 17 and 105 on April 24. Less than 1% (8) of the season total was collected in March, 57% (772) in April, 42% (571) in May, and 1% (13) in June.

Sockeye salmon were captured in the Snake River trap. One smolt of unknown rearing was captured on April 24. The first confirmed hatchery sockeye salmon (adipose fin clip) was trapped May 5 along with three of unknown rearing. About 1% (1) of the sockeye of unknown rearing were trapped in April. One hundred percent (40) of the hatchery reared smolts and 99% (91) of unknown rearing were collected in May. No sockeye salmon were captured in June.

Table 1. River mile and kilometer location for the Snake River drainage.

	Mouth Of Columbia River		Mouth Of Snake River		Lower Granite Dam		Snake River Trap Site		Clearwater River Trap Site		Salmon River Trap Site	
	mi	km	mi	km	mi	km	mi	km	mi	km	mi	km
Asotin Creek rel. site	470.3	756.7	146.0	234.9	38.5	61.9	6.4	10.3	—	—	—	—
Big Canyon Creek	585.9	942.7	261.6	420.9	154.1	247.9	122.0	196.3	—	—	—	—
Catherine Creek	636.9	1024.8	312.6	503.0	205.1	330.0	173.0	278.4	—	—	—	—
Clearwater R. trap site	470.0	756.2	145.7	234.4	38.2	61.5	—	—	0.0	0.0	—	—
Cottonwood Creek	521.7	839.4	197.4	317.6	89.9	144.6	57.8	93.0	—	—	—	—
Crooked River	604.3	972.3	280.0	450.5	172.5	277.6	—	—	134.3	216.0	—	—
Deer Creek	504.3	811.4	180.0	289.6	72.5	116.7	40.4	65.0	—	—	—	—
Dworshak NFH	504.3	811.4	180.0	289.6	72.5	116.6	—	—	34.3	55.2	—	—
EF Salmon @ trap site	873.6	1405.6	549.3	883.8	441.8	710.9	409.7	659.2	—	—	297.0	478.0
Grande Ronde R. mouth	493.0	793.2	168.7	271.4	61.2	98.5	29.1	46.8	—	—	—	—
Hazard Creek	618.7	995.5	294.4	473.7	186.9	300.7	154.8	249.1	—	—	42.1	67.9
Hells Canyon Dam	571.3	919.2	247.0	397.4	139.5	224.5	107.4	172.8	—	—	—	—
Highway 95 boat launch	473.2	761.4	148.9	239.6	41.5	66.8	—	—	3.2	5.1	—	—
Imnaha Coll. Facility	565.6	910.2	241.3	388.3	133.8	215.4	101.7	163.6	—	—	—	—
Imnaha River mouth	516.0	830.3	191.7	309.1	84.2	135.7	52.1	83.8	—	—	—	—
Kooskia NFH	541.6	871.4	217.3	349.6	109.8	176.7	—	—	71.5	115.0	—	—
Little Sheep Creek	553.8	891.1	229.5	369.3	122.0	196.3	89.9	144.6	—	—	—	—
Lookingglass Creek	580.4	933.9	256.1	412.1	148.6	239.1	116.5	187.4	—	—	—	—
Lower Granite Dam	431.8	694.8	107.5	173.0	0.0	0.0	32.1	51.6	38.3	61.5	144.8	232.8
Lower Monumental Dam	365.9	588.7	41.6	66.9	65.9	106.0	98.0	157.7	—	—	192.1	308.9
Pahsimeroi Hatchery	817.5	1315.4	493.2	793.6	385.7	620.6	353.6	568.9	—	—	240.1	387.7
Rapid River Hatchery	605.8	974.7	281.5	452.9	174.0	280.0	141.9	228.3	—	—	29.2	47.1
Red River rearing pond	618.0	994.4	293.7	472.6	186.2	299.6	—	—	148.0	238.1	—	—
Salmon River mouth	512.5	824.6	188.2	302.8	80.7	129.8	48.6	78.2	—	—	64.1	103.0
Salmon River trap site	576.6	927.6	252.3	405.8	144.8	232.8	112.7	181.2	—	—	0.0	0.0
Sawtooth Hatchery	896.7	1444.2	573.3	922.4	465.8	749.5	433.7	697.8	—	—	321.0	516.6
Snake River mouth	324.3	521.8	0.0	0.0	107.5	172.9	139.6	224.6	145.7	234.5	252.3	405.8
Snake River trap site	463.9	746.4	139.6	224.6	32.1	51.6	0.0	0.0	—	—	112.7	181.2
SF Salmon @ Knox Bridge	719.7	1158.0	395.4	636.2	287.9	463.2	255.8	411.6	—	—	143.1	230.4
Spring Creek	614.4	988.6	290.1	466.8	182.6	293.8	150.5	242.2	—	—	—	—
Wildcat Creek	546.2	878.8	221.9	357.0	114.4	184.3	82.3	132.4	—	—	—	—

Coho salmon of unknown rearing were captured throughout the trapping period. About 8% (13) of the season total was collected in March, 30% (48) in April, 61% (97) in May, and 1% (1) in June. These fish were released into the Clearwater drainage and must have strayed up the Snake River in order to be caught in the trap.

Snake River discharge, measured at the Anatone gauge, ranged from 31.8 kcfs to 44.8 kcfs in March. March average discharge (38.3 kcfs) in 2000 was 25.8 kcfs less than in 1999, 1.7 kcfs less than in 1998, and 39.3 kcfs less than in 1997. April average discharge (56.2 kcfs) was 11.2 kcfs and 28.8 kcfs less than in 1999 and 1997, respectively, but 7.2 kcfs greater than in 1998. The April discharge ranged from 41.2 kcfs to 68.2 kcfs. May average discharge (53.6 kcfs) in 2000 was 23.2 kcfs less than in 1999, 52.3 kcfs less than in 1998, and 56.0 kcfs less than in 1997. The May discharge ranged from 41.6 kcfs to 62.4 kcfs. June average discharge (42.6 kcfs) in 2000 was 57.0 kcfs less than in 1999, 48.0 kcfs less than in 1998, and 75.2 kcfs less than in 1997. The June discharge ranged from 24.6 kcfs to 60.0 kcfs.

Water temperature at the Snake River trap was 6°C at the beginning of the trapping season in March. Water temperature gradually increased throughout the sampling season and reached a maximum of 15.5°C on June 8 (Figure 4). Secchi disk transparency measurements were taken daily at the Snake River trap. Transparencies fluctuated throughout the trapping season and ranged from 0.6 m to 2.2 m (Figure 4).

Table 2. Hatchery chinook salmon released into the Snake River system upriver from Lower Granite Dam contributing to the 2000 out-migration.

Drainage Release Site	Hatchery Stock	Release Date	No. Released No. PIT-Tagged
Salmon River			
EF of SF Salmon at Johnson Creek	McCall	3/27/00 - 3/29/00	78,950
	Summer		8,052
Pahsimeroi River at Pahsimeroi Ponds	Pahsimeroi	4/13/00	53,837
	Summer		500
Rapid River at Rapid River Hatchery	Clearwater	3/06/00	463,068
	Spring		—
Rapid River at Rapid River Hatchery	Rapid River	3/15/00 - 4/17/00	2,462,354
	Spring		47,652
SF Salmon River at Knox Bridge	McCall	4/03/00	1,039,930
	Summer		47,495
Salmon River at Sawtooth Hatchery	Sawtooth	4/12/00	123,425
	Spring		1,012
	Drainage Total		4,221,564 104,711
Clearwater River			
Clear Creek Above Kooskia National Fish Hatchery ^a	Kooskia	4/06/00 - 4/09/00	84,304
	Spring		—
Clearwater River at Big Canyon Creek ^b	Lyons Ferry	4/11/00 - 4/13/00	131,306
	Fall		7,424
Clearwater River at Big Canyon Creek ^b	Lyons Ferry	5/30/00 - 6/01/00	497,790
	Fall		1,014
Clearwater River at Big Canyon Creek ^b	Lyons Ferry	6/20/00 - 4/26/00	392,684
	Fall		—
Clearwater River at Big Canyon Creek ^B	Lyons Ferry	6/23/00 - 7/13/00	24,000
	Fall		8,998
Crooked River Acclimation Ponds	Clearwater	4/10/00 - 4/14/00	396,010
	Spring		300
Crooked River Acclimation Ponds	Clearwater	9/28/99	89,299
	Spring		—
Kooskia National Fish Hatchery Rack ^a	Kooskia	4/06/00 - 4/09/00	365,150
	Spring		1,496
NF Clearwater Direct Release ^a	Dworshak	4/07/00 - 4/08/00	1,017,873
	Spring		47,745
Red River Acclimation Ponds	Clearwater	4/10/00	159,051
	Spring		300
Red River Acclimation Ponds	Clearwater	9/27/99	74,981
	Spring		—
Upper Lochsa River at Powell Rearing Ponds on Walton Creek	Clearwater	4/10/00	293,522
	Spring		301
	Drainage Total		3,525,970 67,578
Snake River And Non-Idaho Tributaries			
Catherine Creek Acclimation Pond ^c	Lookingglass	4/01/00 - 4/18/00	37,980
	Spring		3,980
Grand Ronde Acclimation Ponds ^c	Lookingglass	3/14/00	1,508
	Spring		985
Imnaha Acclimation Ponds ^c	Imnaha	4/01/00 - 4/18/00	179,716
	Spring		7,926
Lostine River Acclimation Facility ^b	Lookingglass	4/01/00 - 4/15/00	35,130
	Spring		8,000
Lostine River Acclimation Facility ^c	Lookingglass	4/01/00 - 4/18/00	34,987
	Spring		7,926
Snake River At Billy Creek ^b	Lyons Ferry	6/01/00 - 7/06/00	7,456
	Fall		2,489
Snake River At Captain John's Rapid ^b	Lyons Ferry	4/12/00	131,324
	Fall		2,489
Snake River At Captain John's Rapid ^b	Lyons Ferry	5/31/00	491,033
	Fall		1,001
Snake River At Captain John's Rapid ^b	Lyons Ferry	6/15/00 - 6/23/00	401,814
	Fall		—

Table 2. (Continued.)

Drainage Release Site	Hatchery Stock	Release Date	No. Released No. PIT-Tagged
Snake River at Pittsburgh Landing ^b	Lyons Ferry	4/11/00 - 4/13/00	134,709
	<i>Fall</i>		7,477
Snake River at Pittsburgh Landing ^b	Lyons Ferry	5/24/00 - 5/26/00	398,747
	<i>Fall</i>		7,477
Snake River at Pittsburgh Landing ^b	Lyons Ferry	6/01/00 - 7/06/00	7,449
	<i>Fall</i>		7,449
		Drainage Total	1,861,853
			68,585
		Grand Total	9,609,387
			240,874

All information provided by Idaho Department of Fish and Game unless otherwise noted.

^a US Fish and Wildlife Service

^b Nez Perce Tribe

^c Oregon Department of Fish and Wildlife

Table 3. Hatchery steelhead trout released into the Snake River system upriver from Lower Granite Dam contributing to the 2000 out-migration.

Drainage Release Site	Hatchery Stock	Release Date	No. Released No. PIT Tagged
Salmon River			
EF Salmon River	Magic Valley	4/27/2000	239,981
	B		—
Little Salmon River ^a	Hagerman	4/3/00 & 5/8/00	447,085
	A		300
Little Salmon River at Stinky Springs	Magic Valley	4/11/2000	115,423
	A		—
Little Salmon River at Stinky Springs	Magic Valley	4/11-24/00	300,523
	B		299
Little Salmon River at Stinky Springs	Niagara Springs	4/10/2000	190,996
	A		—
Pahsimeroi River at Pahsimeroi Hatchery	Niagara Springs	4/14/2000	830,315
	A		300
Salmon River at Challis	Magic Valley	4/13/2000	45,741
	A		—
Salmon River at Colston Corner	Magic Valley	4/18/2000	20,625
	A		—
Salmon River at Cottonwood Cg	Magic Valley	4/14/2000	82,172
	A		—
Salmon River at Eyehole	Magic Valley	4/18/2000	21,500
	A		—
Salmon River at Hammer Creek	Niagara Springs	5/5/2000	181,317
	A		298
Salmon River at Kilpatrick	Magic Valley	4/18/2000	21,500
	A		—
Salmon River at Lemhi River	Magic Valley	4/12/2000	137,407
	A		300
Salmon River at Lewis Clark	Magic Valley	4/17/2000	61,732
	A		—
Salmon River at McNabb Point	Magic Valley	4/18/2000	105,578
	A		—
Salmon River at Red Rock	Magic Valley	4/12/2000	62,670
	A		—
Salmon River at Sawtooth Fish Hatchery ^a	Hagerman	4/22-24/00	120,143
	A		2,400
Salmon River at Sawtooth Weir ^a	Hagerman	4/10-25/00	607,654
	A		—
Salmon River at Shoup Bridge	Magic Valley	4/14/2000	62,415
	A		300
Salmon River at Squaw Creek	Magic Valley	4/20-24/00	245,502
	B		600
Salmon River at Squaw Creek Ponds	Magic Valley	4/10/2000	106,135
	B		—
Salmon River at Tunnel Rock	Magic Valley	4/20/2000	108,673
	A		299
Salmon River at Wagonhammer	Magic Valley	4/17/2000	41,091
	A		—
Drainage Total			4,156,178
			5,096
Clearwater River			
American River ^B	Magic Valley	3/05/00 - 3/ 9/00	96,187
	B		300
Clearwater River at Clear Creek	Clearwater	4/19/00	183,857
	B		300
Clearwater River at Clear Creek ^a	Dworshak	4/17/00 - 4/20/00	211,693
	B		900
Crooked River ^b	Clearwater	3/01/00	100,000
	B		—
Meadow Creek ^b	Magic Valley	3/02/00	19,557
	B		—
Mill Creek ^b	Magic Valley	3/02/00	19,556
	B		—

Table 3. (Continued.)

Drainage Release Site	Hatchery Stock	Release Date	No. Released No. PIT Tagged
NF Clearwater Direct Release ^a	Dworshak	5/03/00 - 05/5/00	1,311,447
	B		4,507
NF Clearwater Direct Release ^b	Dworshak	3/01/00	100,000
	B		—
Newsome Creek ^b	Magic Valley	3/03/00 - 3/09/00	100,078
	B		300
Red River ^b	Clearwater	3/01/00	140,000
	B		—
Red River ^b	Magic Valley	3/10/00	30,480
	B		—
SF Clearwater River at American River	Magic Valley	5/05/00	96,187
	B		300
SF Clearwater River at Meadow Creek	Magic Valley	5/02/00	19,557
	B		—
SF Clearwater River at Mill Creek	Magic Valley	5/02/00	19,556
	B		—
SF Clearwater River at Newsome Creek	Magic Valley	5/04/00	100,078
	B		300
SF Clearwater River at Red House Hole	Clearwater	4/20/00	311,416
	B		300
SF Clearwater River at Red House Hole ^a	Dworshak	4/17/00 - 4/20/00	622,567
	B		900
SF Clearwater River at Red River	Magic Valley	5/10/00	30,480
	B		—
		Drainage Total	3,512,696
			8,107
Snake River And Non-Idaho Tributaries			
Big Canyon Facility ^d	Big Canyon	4/12/00 - 4/13/00	178,655
	A		483
Big Canyon Facility ^d	Big Canyon	5/10/00 - 5/25/00	135,048
	A		683
Big Sheep Creek ^b	Irrigon	4/19/00 - 4/20/00	100,007
	A		—
Deer Creek ^d	Na	5/03/00	2,494
	A		2,494
Grande Ronde River at Cottonwood Cr Pond ^c	Lyons Ferry	3/31/00 - 4/30/00	274,146
	A		—
Little Sheep Acclimation Pond ^d	Little Sheep	4/12/00	161,852
	A		512
Little Sheep Acclimation Pond ^d	Little Sheep	5/02/00	66,624
	A		246
Snake River at Hells Canyon Dam	Niagara Springs	3/27/00	601,907
	A		299
Wallowa Acclimation Pond ^d	Wallowa	4/05/00 - 4/06/00	363,485
	A		481
Wallowa Acclimation Pond ^d	Wallowa	5/02/00 - 5/18/00	212,691
	A		688
		Drainage Total	2,096,909
			5,8867
		Grand Total	9,765,783
			19,089

All information provided by Idaho Department of Fish and Game unless otherwise noted.

^a US Fish and Wildlife Service

^b Nez Perce Tribe

^c Washington Department of Fish and Wildlife

^d Oregon Department of Fish and Wildlife

Table 4. Hatchery sockeye salmon and coho salmon released into the Snake River system upriver from Lower Granite Dam contributing to the 2000 out-migration.

Drainage Release Site	Species	Hatchery	Release Date	No. Released No. PIT Tagged
Clearwater River				
Clear Creek ^a	Coho	Dworshak	5/10/2000	277,750 803
Lapwai Creek ^a	Coho	Willard	3/15/2000	267,102 1,500
Potlatch River ^a	Coho	Willard	3/17/2000	267,166 1,498
			Drainage Total	812,018 3,801
Salmon River				
Alturas Lake	Sockeye	Sawtooth	5/23/2000	12,955 1,500
Redfish Lake	Sockeye	Eagle	5/9/2000	148 148
			Drainage Total	13,103 1,648

All information provided by Idaho Department of Fish and Game unless otherwise noted.

^a Nez Perce Tribe

Table 5. Historical catch of hatchery chinook salmon (HC), wild chinook salmon (WC), hatchery steelhead trout (HS), and wild steelhead trout (WS) collected at the Snake, Clearwater, and Salmon river traps for the out-migration years of 1993 through 2000.

Year	Species / Run	Snake River Trap	Clearwater River Trap	Salmon River Trap
2000	HC	5,566	No Data	22,175
	WC	2,214		3,373
	HS	8,777		2,290
	WS	1,364		336
1999	HC	15,327	No Data	23,180
	WC	6,411		5,079
	HS	7,271		2,554
	WS	1,050		228
1998	HC	3,487	No Data	10,852
	WC	1,063		1,459
	HS	8,001		1,218
	WS	1,116		112
1997	HC	1,543	No Data	2,280
	WC	898		1,065
	HS	1,600		1,267
	WS	196		66
1996	HC	3,163	No Data	6,205
	WC	1,140		1,776
	HS	8,921		9,566
	WS	896		304
1995	HC	26,919	13,475	45,349
	WC	6,564	1,534	9,396
	HS	23,994	8,314	3,948
	WS	1,750	285	499
1994	HC	22,342	32,789	38,902
	WC	1,471	1,343	4,774
	HS	31,662	4,615	7,383
	WS	3,439	1,798	564
1993	HC	15,271	9,761	28,326
	WC	2,683	320	5,147
	HS	35,183	10,122	73
	WS	3,046	882	9

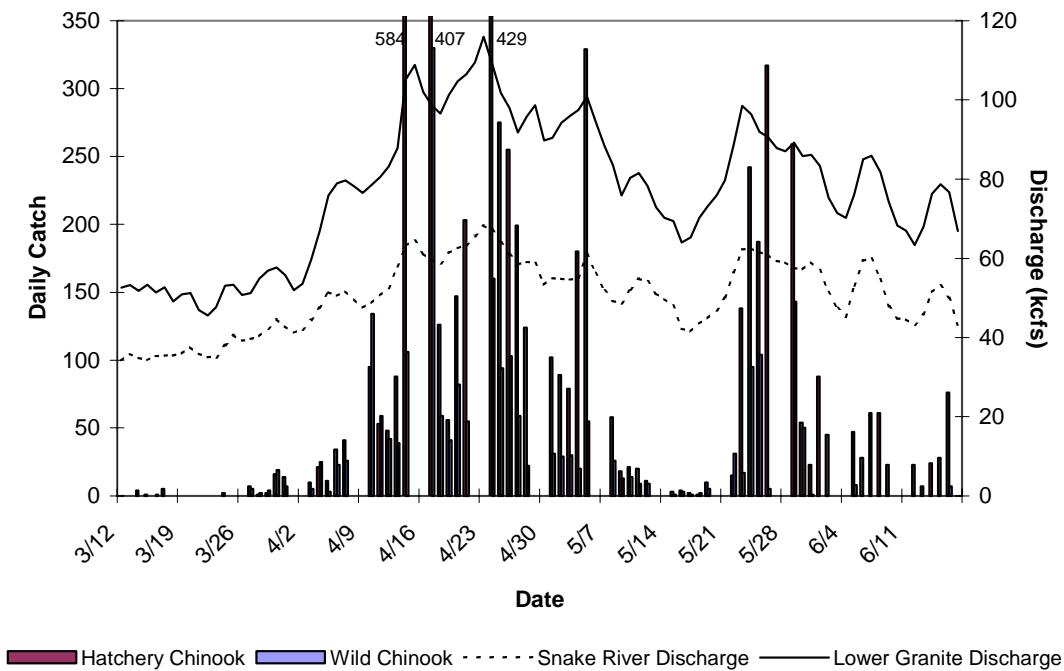


Figure 2. Snake River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Snake River and Lower Granite discharge, 2000. Hatchery chinook includes 365 unknown rearing 5/22/00 - 5/26/00.

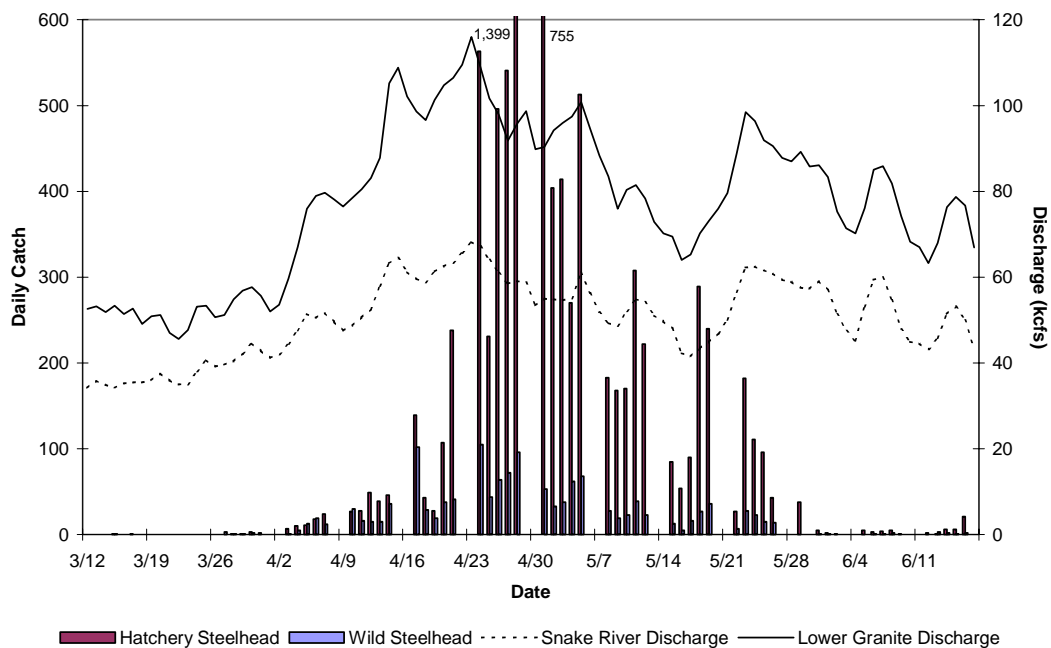


Figure 3. Snake River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Snake River and Lower Granite discharge, 2000.

Salmon River Trap Operation

The Salmon River scoop trap captured 22,175 age-1 hatchery chinook salmon, 3,373 age-1 wild chinook salmon, 2,290 hatchery steelhead trout, 336 wild steelhead trout, two hatchery and six unknown rearing sockeye salmon in 2000 (Table 5).

Hatchery chinook salmon were present on the first day of the trapping season, March 13. This was greatly influenced by the release of 463,068 Rapid River hatchery chinook salmon on March 6. Daily catch ranged from 140 to 1,921 during March (Figure 5). The April daily captures ranged from 118 to 2,641, except for 87 captures on April 3 and 73 on April 28. The surge of fish (1,639 on April 5, 2,641 on April 6, and 1,681 on April 7) was most likely influenced by McCall hatchery's release of 1,039,930 hatchery chinook salmon into the South Fork Salmon River on April 3. Then, the daily catch fluctuated from 73 to 121 until May 5. The daily catch remained less than 22 through the end of the trapping season on May 22. About 43% (9,620) of the season total was captured in March, 54% (11,899) in April, and 3% (656) in May.

Ten wild chinook salmon were trapped on March 13. The daily catch ranged from four to 91 between March 13 and April 3, except for 101 captures on March 29. The daily catch ranged from 137 to 305 between April 3 and April 14. The daily catch then fluctuated from two to 84 through the end of the trapping season on May 22, except for 147 captures on April 19. About 13% (433) of the season total was captured in March, 80% (2,695) in April, and 7% (245) in May.

Hatchery steelhead trout first arrived at the trap on April 6. Catch rates remained below 100 fish per day until April 19 when the daily catch reached 114. From April 20 through May 2, the daily catch fluctuated between 35 and 246. Then, the daily catch ranged from 22 to 80 until May 12. Between 105 and 171 daily captures then occurred through May 17. The daily catch declined to nine at the end of the trapping season on May 22. About 46% (1,061) of the season total was captured in April and 54% (1,229) in May (Figure 6).

A wild steelhead trout first arrived on April 4. The daily catch fluctuated between zero and 45 throughout the April and May trapping period. The peak daily catch occurred on April 19. About 58% (195) of the season total was captured in April and 42% (141) in May.

Eight sockeye salmon were captured in the Salmon River trap. One sockeye of unknown rearing was captured on March 16. No other sockeye were captured until May 12 when one of unknown rearing was trapped. The first hatchery-reared sockeye was collected on May 15. One hundred percent (two) of the hatchery sockeye were captured in May. About 17% (one) sockeye of the unknown rearing were trapped in March while 83% (five) were captured in May.

Salmon River discharge, measured at the White Bird gauge, ranged from 4.9 kcfs to 7.6 kcfs in March. March average discharge (5.6 kcfs) in 2000 was 2.6 kcfs less than in 1999, 1.0 kcfs less than in 1998, and 3.4 kcfs less than in 1997. April average discharge (15.4 kcfs) was 1.9 kcfs and 4.9 kcfs greater in 1999 and 1998, respectively, but 2.8 kcfs less than in 1997. The April discharge ranged from 6.6 kcfs to 23.3 kcfs. May average discharge (29.2 kcfs) in 2000 was 5.1 kcfs less than in 1999, 7.2 kcfs less than in 1998, and 29.7 kcfs less than in 1997. The May discharge ranged from 18.8 kcfs to 41.6 kcfs.

Water temperature at the Salmon River trap was as low as 5°C at the beginning of the trapping season in March. Water temperature gradually increased throughout the sampling season and reached a maximum of 11.0°C on May 19 (Figure 7). Secchi disk transparency measurements were taken daily at the Salmon River trap. Transparencies fluctuated throughout the trapping season and ranged from 0.5 m to 2.5 m (Figure 7).

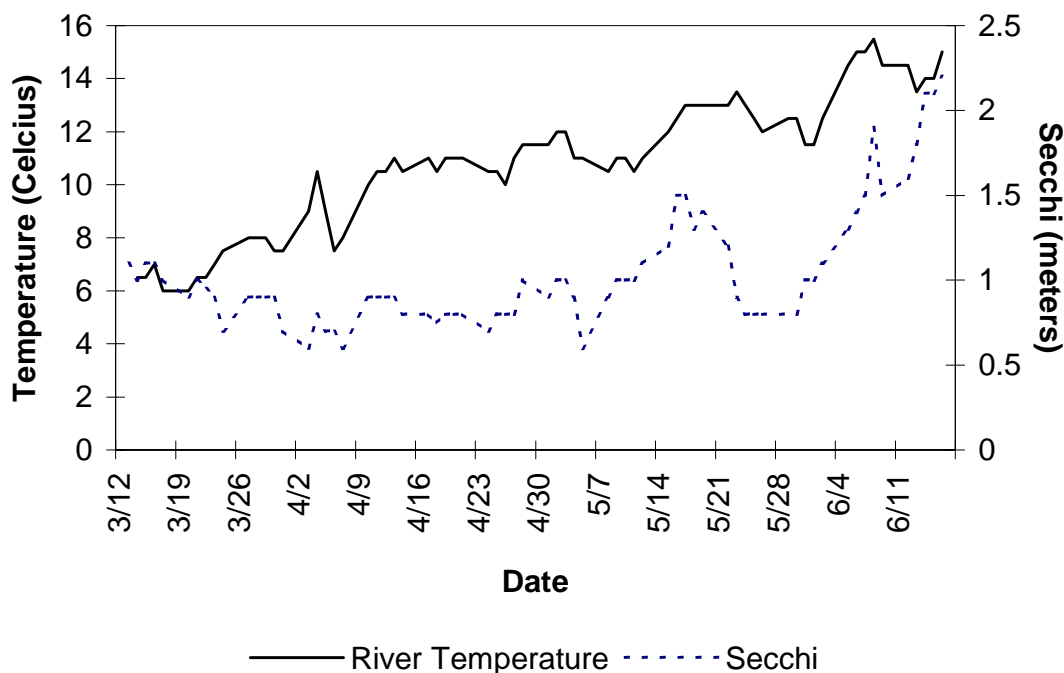


Figure 4. Daily water temperature and Secchi disk transparency for Snake River at the trap, 2000.

Travel Time and Migration Rates

Release Sites to Snake River Trap

Hatchery Spring Chinook Salmon—In 2000, 49 PIT-tagged hatchery spring chinook salmon were interrogated at the Snake River trap. One was from the Grande Ronde River (0.7 d travel time to the Snake River trap), 19 from the Imnaha River weir (average 30 d), six from the Lostine River Pond (average 25 d), 21 from the Rapid River hatchery (average 40 d), and two from the Sawtooth trap (average 15 d).

Wild Spring Chinook Salmon—In 2000, four PIT-tagged wild spring chinook salmon were interrogated at the Snake River Trap. Two were from the Grande Ronde River (average 2.7 d travel time to Snake River trap), one from the Lostine River (259 d), and one from the Sawtooth trap (215 d).

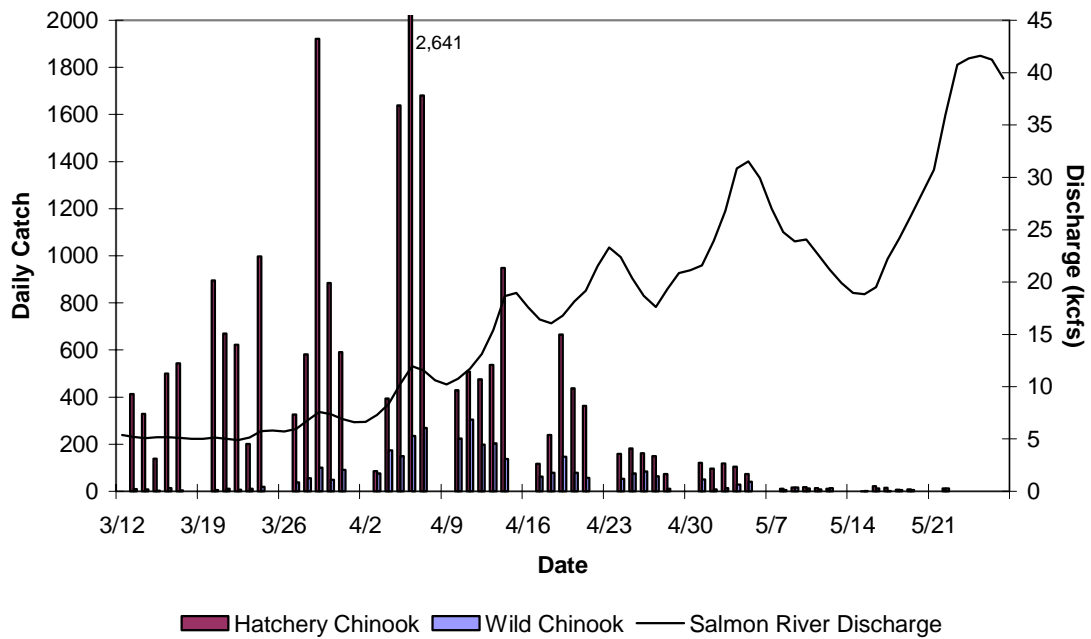


Figure 5. Salmon River trap daily catch of hatchery chinook salmon and wild chinook salmon overlaid by Salmon River discharge, 2000.

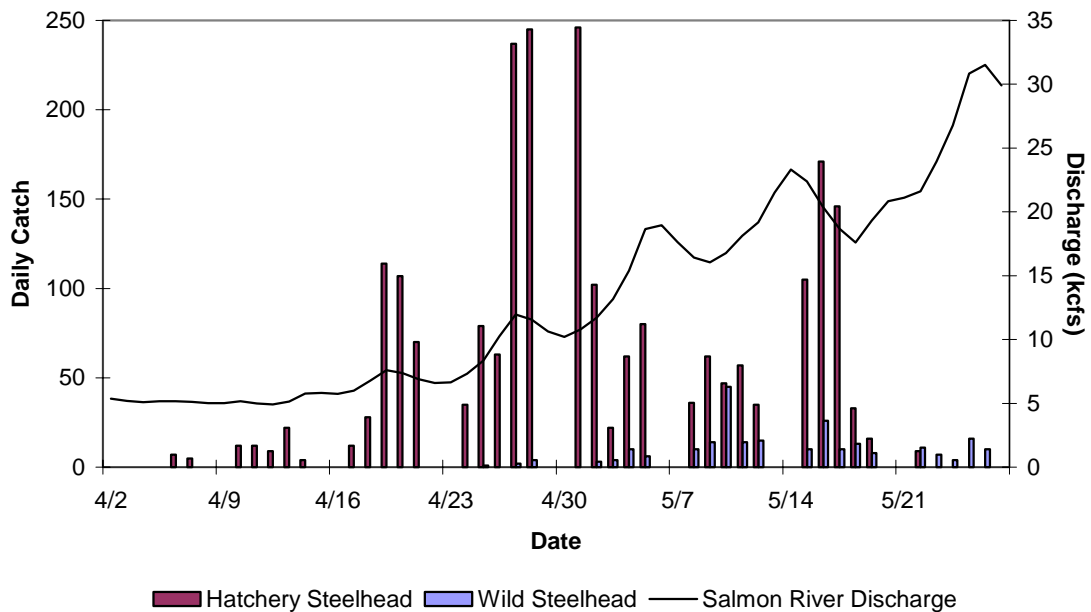


Figure 6. Salmon River trap daily catch of hatchery steelhead trout and wild steelhead trout overlaid by Salmon River discharge, 2000.

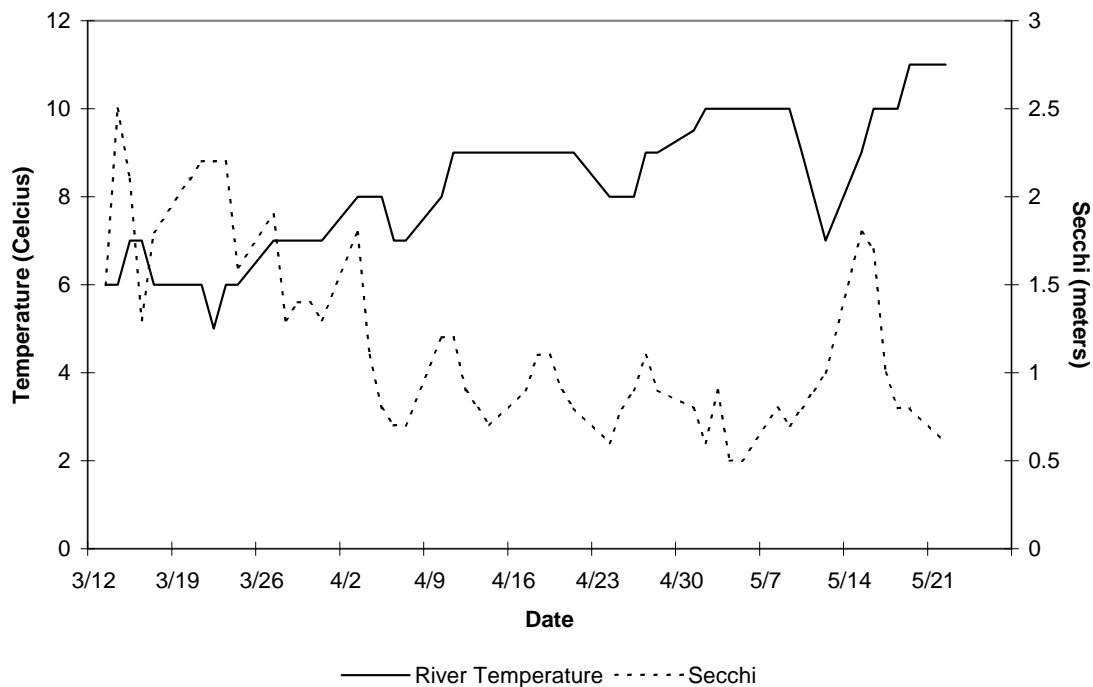


Figure 7. Daily temperature and Secchi disk transparency for the Salmon River trap, 2000.

Hatchery Summer Chinook Salmon—In 2000, 26 PIT-tagged hatchery summer chinook salmon were interrogated at the Snake River trap. One was from the Imnaha River (24 d travel time to the Snake River trap), two from the Imnaha trap (average 7.2 d), one from Johnson Creek (37 d), and 22 from Knox Bridge (average 27 d).

Wild Summer Chinook Salmon—In 2000, seven PIT-tagged wild summer chinook salmon were interrogated at the Snake River trap. One was from the Imnaha weir (161 d travel time to the Snake River trap), two from the Imnaha trap (average 2.5 d), one from Johnson Creek (241 d), one from the Johnson Creek trap (16 d), and two from the Lower South Fork Salmon River trap (average 209 d).

Hatchery Fall Chinook Salmon—In 2000, 17 PIT-tagged hatchery fall chinook salmon were interrogated at the Snake River trap. Ten were from the Captain John Rapids Acclimation Pond (average 1.7 d travel time to the Snake River trap), five from the Pittsburgh Landing Acclimation Facility (average 20 d), and two into the Snake River (average 3.6 d).

Unknown Run Hatchery Chinook Salmon—In 2000, three unknown run chinook salmon were interrogated at the Snake River trap. They were from the Salmon River trap, and their average travel time to the Snake River trap was 13 d.

Unknown Run Wild Chinook Salmon—In 2000, six unknown run wild chinook salmon were interrogated at the Snake River trap. Four were from the Salmon River trap (average 9.7 d travel time to the Snake River trap), one was from the Snake River (20 d), and one was from the Snake River trap (1.9 d).

Hatchery Steelhead Trout—In 2000, 11 hatchery steelhead trout were interrogated at the Snake River trap. One was from the Big Canyon Facility (36 d travel time to the Snake River trap), two from the Grande Ronde River (average 0.9 d), two from the Imnaha trap (average 2.8 d), one from the Pahsimeroi trap (8.9 d), two from the Sawtooth Hatchery (average 14 d), one from the Snake River trap (0.8 d), and two from the Wallowa Hatchery (average 12 d).

Wild Steelhead Trout—In 2000, six wild steelhead trout were interrogated at the Snake River trap. Two were from the Imnaha trap (average 7.6 d travel time to the Snake River trap), one from Lick Creek (254 d), one from the Lostine River (204 d), and two from the Snake River trap (average 1.9 d).

Hatchery Sockeye Salmon—In 2000, three hatchery sockeye salmon were interrogated at the Snake River trap. Two were from Alturas Lake (average 208 d travel time to the Snake River trap) and one from Pettit Lake (225 d).

Wild Sockeye Salmon—In 2000, three wild sockeye salmon were interrogated at the Snake River trap. All three were from Alturas Lake Creek (average 5.8 d travel time to the Snake River trap).

Release Sites to the Salmon River Trap

Hatchery Spring Chinook Salmon—In 2000, 222 PIT-tagged hatchery chinook salmon were interrogated at the Salmon River trap. A group that was released from Rapid River hatchery had 214 recaptured at the Salmon River trap (average travel time was 20.5 d). The other group of eight recaptures was released from the Sawtooth trap (average travel time was 6.8 d).

Wild Spring Chinook Salmon—In 2000, four PIT-tagged wild spring chinook salmon were interrogated at the Salmon River trap. Two were from the Lemhi Weir (average 158 d travel time to Salmon River trap) and two from the Marsh Creek trap (179 d).

Hatchery Summer Chinook Salmon—In 2000, 95 PIT-tagged hatchery summer chinook salmon were interrogated at the Salmon River trap. Five were released in Johnson Creek (average travel time was 12 d) and 90 were from released from Knox Bridge (average travel time was 10 d).

Wild Summer Chinook Salmon—In 2000, 17 wild summer chinook salmon were interrogated at the Salmon River trap. Four were from the Johnson Creek trap (average travel time to the Salmon River trap was 203 d). One fish was released in Lake Creek and took 173 d to reach the Salmon River trap. Six were released from the Lower South Fork Salmon River trap (average travel time was 153 d), and six were released from the South Fork Salmon River trap (average travel time was 134 d).

Unknown Run Chinook Salmon—Two unknown run chinook salmon were interrogated at the Salmon River trap in 2000. Both were fish that had been PIT tagged at the Salmon River trap and then recaptured at the trap.

Hatchery Steelhead Trout—One hatchery steelhead trout was interrogated at the Salmon River trap. It had been released at the Squaw Creek Pond (travel time was 6.7 d)

Head of Lower Granite Reservoir to Lower Granite Dam

The PIT tag sample rate at the dams changed significantly during the 2000 out-migration, mainly due to the fluctuation of spill. This is the eighth year since the Smolt Monitoring Project began PIT tagging in 1987 that a significant period of spill occurred. The following example illustrates how median travel time estimates are affected by spill.

A group of fish tagged and released at the Snake River trap passes Lower Granite Dam over a ten-day period. When spill occurs, the facility sampling efficiency for these fish is decreased because a portion of the fish that would normally be sampled instead passes via spill. Spill during the second half of the passage period could cause the number of fish during that half to be underestimated, making the date the median fish passed Lower Granite earlier than the actual date. Likewise, spill during the first half of the passage period would artificially shift the date of median passage later than the true date. The calculation of mean discharge for the median migration period is affected by the incorrect estimate of the median migration period. If discharge were increasing for the passage period of the above group, and spill occurred during the second half, thereby making the date of median passage earlier, then mean discharge for that group is also underestimated.

Another effect spill may have on migration rate is that the more highly smolted fish are more buoyant and migrate higher in the water column. They are also the fastest migrating fish (Beeman and Rondorf, in press). The ten-foot-deep debris boom in front of the turbines at Lower Granite Dam may divert a greater portion of these higher floating fish to the spill where they are not interrogated. A greater portion of the deeper migrating, slower moving fish may migrate through the powerhouse and be collected and subsequently interrogated (Giorgi et al. 1988). This type of bias would incorrectly estimate migration rate with the estimated median migration rate being less than the true rate. This makes any interpretation of the PIT tag data at the dams extremely difficult during the periods of major operational changes. It also means that if fish collected at Lower Granite Dam are transported, then the portion of the population that passes Lower Granite is no longer representative of the population that arrived at Lower Granite.

Hatchery Chinook Salmon PIT-Tag Groups—Sufficient numbers of hatchery chinook salmon were PIT tagged daily at the Snake River trap to provide 36 daily release groups (3,598 individual fish) for median migration rate calculations through Lower Granite Reservoir from April 4 through June 16 (Appendix A, Table 1). Median travel time ranged from 21.3 to 4.6 d (2.4 km/d to 11.3 km/d migration rate) and averaged 9.0 d (6.8 km/d).

Linear regression analysis detected a significant relation between migration rate in Lower Granite Reservoir and average Lower Granite inflow (Table 6) for PIT-tagged hatchery chinook salmon groups (Table 7). The equation shows that as discharge increases, migration rate increases.

Sufficient numbers of hatchery chinook salmon were PIT-tagged daily at the Salmon River trap to provide 42 daily release groups (4,733 individual fish) for median migration rate calculations through Lower Granite Reservoir from March 13 through May 22 (Appendix A, Table 5). Median travel time ranged from 39.0 to 6.5 d (6.0 km/d to 36.1 km/d migration rate) and averaged 23.5 d (12.3 km/d).

Linear regression analysis detected a significant relation between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite inflow (Table 7) for PIT-tagged hatchery chinook salmon groups (Table 8). The equation shows that as discharge increases, migration rate increases.

Wild Chinook Salmon PIT-Tag Groups—Sufficient numbers of wild chinook salmon were PIT-tagged daily at the Snake River trap to provide 30 daily release groups (1,930 individual fish) for median migration rate calculations through Lower Granite Reservoir from April 4 through May 30 (Appendix A, Table 2). Median travel time ranged from 28.7 to 2.3 d (1.8 km/d to 22.2 km/d migration rate) and averaged 8.0 d (9.1 km/d).

Linear regression analysis detected a significant relation between migration rate in Lower Granite Reservoir and average Lower Granite inflow (Table 6) for PIT-tagged wild chinook salmon groups (Table 7). The equation shows that as discharge increases, migration rate increases.

Sufficient numbers of wild chinook salmon were PIT-tagged daily at the Salmon River trap to provide 28 daily release groups (1,950 individual fish) for median migration rate calculations through Lower Granite Reservoir from March 27 through May 22 (Appendix A, Table 6). Median travel time ranged from 18.7 to 7.5 d (12.5 km/d to 31.1 km/d migration rate) and averaged 12.4 d (19.8 km/d).

Linear regression analysis detected a significant relation, at the 0.10 level of significance, between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite inflow (Table 7) for PIT-tagged wild chinook salmon groups (Table 8). The equation shows that as discharge increases, migration rate increases.

Hatchery Steelhead Trout PIT Tag Groups—Sufficient numbers of hatchery steelhead trout were PIT-tagged daily at the Snake River trap to provide 37 daily release groups (3,656 individual fish) for median migration rate calculations through Lower Granite Reservoir from April 6 through May 29 (Appendix A, Table 3). Median travel time ranged from 4.1 to 1.5 d (12.7 km/d to 34.0 km/d migration rate) and averaged 2.4 d (22.8 km/d).

Table 6. Migration rates (km/d), stratified by 5-kcfs intervals from the Snake River trap to Lower Granite Dam, 2000.

Discharge Interval	Hatchery Chinook	Wild Chinook	Hatchery Steelhead	Wild Steelhead
60 - 65	4.88			
65 - 70	3.50	1.80	15.05	
70 - 75	3.42	2.00	19.58	22.44
75 - 80	5.16	6.45	18.94	19.75
80 - 85	4.15	6.39	22.18	23.34
85 - 90	9.19	8.54	20.24	15.10
90 - 95	9.65	10.47	25.58	23.46
95 - 100	7.12	10.01	24.07	23.83
100 - 105	6.84	9.52	29.19	29.00
105 - 110	7.79	10.70	29.17	29.95
110 - 115			34.00	

Table 7. Linear regression statistics for migration rate/discharge relations by species, rearing type, and trap, using data stratified by 5 kcfs intervals, 2000.

Species	Trap	N	Intercept	Slope	r^2	P
Hatchery Chinook	Snake	10	-5.334	1.590	0.538	0.016
	Salmon	8	-5.053	1.665	0.740	0.006
Wild Chinook	Snake	13	-16.014	4.014	0.787	0.001
	Salmon	7	-1.073	0.905	0.479	0.085
Hatchery Steelhead	Snake	10	-3.203	1.405	0.912	<0.001
	Salmon	9	1.088	0.604	0.526	0.042
Wild Steelhead	Snake	8	-1.042	0.923	0.328	0.138
	Salmon	ND				

Table 8. Migration rates (km/d), stratified by 5-kcfs intervals, from the Salmon River trap to Lower Granite Dam, 2000

Discharge Interval	Hatchery Chinook	Wild Chinook	Hatchery Steelhead	Wild Steelhead
65 - 70	6.45			
70 - 75	9.56	14.00	38.47	61.60
75 - 80	10.88	16.70	40.28	
80 - 85	11.27	21.61	41.50	
85 - 90	9.11	22.20	43.01	
90 - 95	13.78	18.14	49.84	60.08
95 - 100	12.59	19.97	46.75	55.42
100 - 105	15.53	21.36	40.64	60.10
105 - 110			54.03	67.10
110 - 115				67.40

Linear regression analysis detected a significant relation between migration rate in Lower Granite Reservoir and average Lower Granite inflow (Table 6) for PIT-tagged hatchery steelhead trout groups (Table 7). The equation shows that as discharge increases, migration rate increases.

Sufficient numbers of hatchery steelhead trout were PIT-tagged daily at the Salmon River trap to provide 27 daily release groups (2,093 individual fish) for median migration rate calculations through Lower Granite Reservoir from April 11 through May 19 (Appendix A, Table 3). Median travel time ranged from 19.8 to 3.7 d (11.8 km/d to 64.1 km/d migration rate) and averaged 6.4 d (41.9 km/d).

Data stratified by 5 kcfs groups were used in the regression analysis (Table 8). The linear regression analysis detected a significant relation between migration rate from the Salmon River trap to Lower Granite Dam and average Lower Granite discharge for PIT-tagged hatchery steelhead trout groups marked at the Salmon River trap (Table 7). The equation shows that as discharge increases, migration rate increases.

Wild Steelhead Trout PIT-Tag Groups—Sufficient numbers of wild steelhead trout were PIT tagged daily at the Snake River trap to provide 30 daily release groups (1,209 individual fish) for median migration rate calculations through Lower Granite Reservoir from April 10 through May 25 (Appendix A, Table 4). Median travel time ranged from 3.4 to 1.7 d (15.1 km/d to 30.2 km/d migration rate) and averaged 2.3 d (23.8 km/d).

Linear regression analysis was unable to detect a significant relation between migration rate in Lower Granite Reservoir and average Lower Granite inflow (Table 6) for PIT-tagged wild steelhead trout groups (Table 7).

Insufficient numbers of wild steelhead trout (160) were PIT tagged at the Salmon River trap to estimate travel time and migration rate to Lower Granite Dam (Appendix A, Table 8).

Interrogation of PIT-Tagged Fish

Interrogation data in 2000 are not directly comparable with the earlier years. All species-run-rearing types will be underestimated due to a reduction in collection efficiency during spill at the dams. During other times of the season the interrogation rate may vary sporadically due to fluctuations in turbine operations. The fourth collection facility in the system, at Lower Monumental Dam, became operational in 1993 and total interrogations may be greater beginning in 1993 than in previous years. Therefore, any comparison in trends of cumulative detection at dams must be done cautiously, in a manner that incorporates these additional factors.

After combining to remove groups with small sample size, percent interrogation of Snake River trap hatchery chinook salmon and wild chinook salmon daily PIT tag release groups at Lower Granite Dam ranged from 7.1% to 47.3% for hatchery fish (Appendix B, Table 1). Wild chinook ranged from 7.9% to 52.9% (Appendix B, Table 2). Seasonal cumulative interrogation rate of PIT-tagged hatchery chinook salmon to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 11.1% and 81.2% and averaged 56.5% (Table 9). Wild chinook salmon cumulative interrogation rates ranged between 12.3% and 88.9% and averaged 64.7% (Table 9).

Table 9. Interrogations of PIT-tagged fish from the Snake River trap, 1987-2000; Clearwater River trap, 1989-1995; and Salmon River trap 1993-2000, at downstream collection facilities.

Site	Year	Species ^a	Number Interrogated/Site									Grand Total Ints	Total % Obs.
			Number Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
Snake	2000	CH	3,963	1,179	29.8%	677	17.1%	188	4.7%	195	4.9%	2,239	56.5%
	1999	CH	4,268	997	23.4%	1,515	35.5%	516	12.1%	206	4.8%	3,234	75.8%
	1998	CH	2,303	1,077	46.8%	510	22.2%	192	8.3%	71	3.1%	1,850	80.3%
	1997	CH	—	—	—	—	—	—	—	—	—	—	—
	1996	CH	1,450	497	34.3%	259	17.9%	189	13.0%	40	2.8%	985	67.9%
	1995	CH	3,927	1,646	41.9%	643	16.4%	430	11.0%	153	3.9%	2,872	73.1%
	1994	CH	2,844	885	31.1%	332	11.7%	223	7.8%	329	11.6%	1,769	62.2%
	1993	CH	3,203	1,336	41.7%	494	15.4%	246	7.7%	134	4.2%	2,210	69.0%
	1992	CH	410	166	40.5%	83	20.2%	—	0.0%	48	11.7%	297	72.4%
Snake	2000	CW	1,989	550	27.7%	480	24.1%	144	7.2%	112	5.6%	1,286	64.7%
	1999	CW	3,624	804	22.2%	1,515	41.8%	567	15.6%	121	3.3%	3,007	83.0%
	1998	CW	961	442	46.0%	190	19.8%	89	9.3%	42	4.4%	763	79.4%
	1997	CW	—	—	—	—	—	—	—	—	—	—	—
	1996	CW	842	269	31.9%	190	22.6%	119	14.1%	40	4.8%	618	73.4%
	1995	CW	2,067	1,023	49.5%	366	17.7%	216	10.5%	68	3.3%	1,673	80.9%
	1994	CW	934	354	37.9%	95	10.2%	82	8.8%	83	8.9%	614	65.7%
	1993	CW	1,125	576	51.2%	150	13.3%	57	5.1%	46	4.1%	829	73.7%
Snake	1992	CU	615	249	40.5%	106	17.2%	—	0.0%	72	11.7%	427	69.4%
	1991	CU	2,131	929	43.6%	409	19.2%	—	0.0%	115	5.4%	1,453	68.2%
	1990	CU	2,245	956	42.6%	310	13.8%	—	0.0%	180	8.0%	1,446	64.4%
	1989	CU	6,222	2,384	38.3%	1,367	22.0%	—	0.0%	482	7.7%	4,233	68.0%
	1988	CU	3,767	1,237	32.8%	543	14.4%	—	0.0%	299	7.9%	2,079	55.2%
	1987 ^b	CU	3,275	1,067	32.6%	338	10.3%	—	0.0%	308	9.4%	1,713	52.3%
Snake	2000	SH	3,717	2,122	57.1%	342	9.2%	203	5.5%	41	1.1%	2,708	72.9%
	1999	SH	3,990	1,185	29.7%	1,175	29.4%	537	13.5%	89	2.2%	2,986	74.8%
	1998	SH	4,274	2,230	52.2%	640	15.0%	303	7.1%	61	1.4%	3,234	75.7%
	1997	SH	1,459	750	51.4%	328	22.5%	123	8.4%	12	0.8%	1,213	83.1%
	1996	SH	1,363	675	49.5%	247	18.1%	139	10.2%	24	1.8%	1,085	79.6%
	1995	SH	2,244	1,477	65.8%	236	10.5%	165	7.4%	19	0.8%	1,897	84.5%
	1994	SH	3,239	1,298	40.1%	216	6.7%	112	3.5%	40	1.2%	1,666	51.4%

Table 9. (Continued.)

Number Interrogated/Site													
Site	Year	Species ^a	Number Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ	Grand Total Ints	Total % Obs.
Snake	1993	SH	2,521	1,925	76.4%	235	9.3%	63	2.5%	13	.5%	2,236	88.7%
	1992	SH	3,904	1,496	38.3%	227	5.8%	—	0.0%	30	0.8%	1,753	44.9%
	1991	SH	2,577	2,032	78.9%	268	10.4%	—	0.0%	11	0.4%	2,311	89.7%
	1990	SH	3,112	2,272	73.0%	282	9.1%	—	0.0%	33	1.1%	2,587	83.1%
	1989	SH	2,525	1,773	70.2%	268	10.6%	—	0.0%	35	1.4%	2,076	82.2%
	1988	SH	1,743	1,069	61.3%	190	10.9%	—	0.0%	12	0.7%	1,271	72.9%
	1987	SH	827	324	39.2%	52	6.3%	—	0.0%	6	0.7%	382	46.2%
Snake	2000	SW	1,312	5879	44.9%	214	16.3%	105	8.0%	28	2.1%	936	71.3%
	1999	SW	923	254	27.5%	304	32.9%	111	12.0%	19	2.1%	688	74.5%
	1998	SW	1,088	624	57.4%	154	14.2%	81	7.4%	8	0.7%	867	79.7%
	1997	SW	148	82	55.4%	38	25.7%	6	4.1%	1	0.7%	127	85.8%
	1996	SW	655	293	44.7%	137	20.9%	67	10.2	12	1.8%	509	77.7%
	1995	SW	1,537	967	62.9%	195	12.7%	122	7.9%	13	0.8%	1,297	84.4%
	1994	SW	2,840	1,546	54.4%	319	11.2%	158	5.6%	51	1.8%	2,074	73.0%
	1993	SW	2,867	1,982	69.1%	267	9.3%	133	4.6%	32	1.1%	2,414	84.2%
	1992	SW	2,538	1,511	59.5%	307	12.1%	—	0.0%	31	1.2%	1,849	72.9%
	1991	SW	3,549	2,266	63.8%	625	17.6%	—	0.0%	66	1.9%	2,957	83.3%
	1990	SW	3,078	2,016	65.5%	356	11.6%	—	0.0%	60	1.9%	2,432	79.0%
	1989	SW	1,798	1,170	65.1%	240	13.3%	—	0.0%	52	2.9%	1,462	81.3%
	1988	SW	1,186	698	58.9%	166	14.0%	—	0.0%	20	1.7%	884	74.5%
	1987	SW	464	229	49.4%	48	10.3%	—	0.0%	8	1.7%	285	61.4%
Clearwater	1995	CH	2,467	950	38.5%	414	16.8%	269	10.9%	109	4.4%	1,742	70.6%
	1994	CH	1,998	500	25.0%	192	9.6%	188	9.4%	247	12.4%	1,127	56.4%
	1993	CH	1,624	553	34.1%	193	11.9%	106	6.5%	77	4.7%	929	57.2%
	1992	CH	5,200	1,654	31.8%	745	14.3%	—	0.0%	429	8.3%	2,828	54.4%
Clearwater	1995	CW	1,051	464	44.1%	173	16.5%	88	8.4%	37	3.5%	762	72.5%
	1994	CW	761	308	40.5%	94	12.4%	81	10.6%	41	5.4%	524	68.9%
	1993	CW	298	134	45.0%	43	14.4%	25	8.4%	18	6.0%	220	73.8%
Clearwater	1992	CU	1,461	502	34.4%	202	13.8%	—	0.0%	136	9.3%	840	57.5%
	1991	CU	3,943	1,483	37.6%	668	16.9%	—	0.0%	235	6.0%	2,386	60.5%

Table 9. (Continued.)

Site	Year	Species ^a	Number Interrogated/Site									Grand Total Ints	Total % Obs.
			Number Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
32	Clearwater	1990 CU	4,242	1,359	32.0%	674	15.9%	—	0.0%	281	6.6%	2,314	54.6%
		1989 CU	2,441	756	31.0%	452	18.5%	—	0.0%	140	5.7	1,348	55.2%
	Clearwater	1995 SH	867	602	69.4%	69	8.0%	56	6.5%	3	0.3%	730	84.2%
		1994 SH	1,250	729	58.3%	119	9.5%	30	2.4%	10	0.8%	888	71.0%
		1993 SH	1,102	813	73.8%	79	7.2%	24	2.2%	6	0.5%	922	83.7%
		1992 SH	1,567	823	52.5%	118	7.5%	—	0.0%	6	0.4%	947	60.4%
		1991 SH	1,215	926	76.2%	89	7.3%	—	0.0%	3	0.2%	1,018	83.8%
		1990 SH	1,228	880	71.7%	63	5.1%	—	0.0%	10	0.8%	953	77.6%
		1989 SH	290	173	59.7%	16	5.5%	—	0.0%	2	0.7%	191	65.9%
	Clearwater	1995 SW	268	157	58.6%	40	14.9%	16	6.0%	1	0.4%	214	79.9%
		1994 SW	1,297	421	32.5%	150	11.6%	106	8.2%	24	1.9%	701	54.0%
		1993 SW	849	560	66.0%	106	12.5%	58	6.8%	9	1.1%	733	86.3%
		1992 SW	2,996	1,599	53.4%	477	15.9%	—	0.0%	113	3.8%	2,189	73.1%
		1991 SW	1,300	767	59.0%	126	9.7%	—	0.0%	22	1.7%	915	70.4%
		1990 SW	727	409	56.3%	102	14.0%	—	0.0%	28	3.9%	539	74.1%
		1989 SW	104	53	51.0%	16	15.4%	—	0.0%	3	2.9%	72	69.2%
	Salmon	2000 CH	4,804	1,486	30.9%	708	14.7%	214	4.5%	230	4.8%	2,638	54.9%
		1999 CH	5,611	1,128	20.1%	1,551	27.6%	604	10.8%	240	4.3%	3,523	62.8%
		1998 CH	3,025	1,098	36.3%	565	18.7%	201	6.6%	87	2.9%	1,951	64.5%
		1997 CH	—	—	—	—	—	—	—	—	—	—	—
		1996 CH	2,554	618	24.2%	343	13.4%	258	10.1%	67	2.6%	1,286	50.4%
		1995 CH	5,074	1,777	35.0%	757	14.9%	531	10.5%	186	3.7%	3,251	64.1%
		1994 CH	3,633	870	23.9%	322	8.9%	258	7.1%	358	9.9%	1,808	49.8%
		1993 CH	3,138	1,144	36.5%	385	12.3%	233	7.4%	157	5.0%	1,919	61.2%
	Salmon	2000 CW	2,069	654	31.6%	494	23.9%	163	7.9%	103	5.0%	1,414	68.3%
		1999 CW	3,628	833	23.0%	1,500	41.3%	421	11.6%	125	3.4%	2,879	79.4%
		1998 CW	1,416	657	46.4%	305	21.5%	105	7.4%	70	4.9%	1,137	80.3%
		1997 CW	—	—	—	—	—	—	—	—	—	—	—
		1996 CW	1,425	381	26.7%	289	20.3%	181	12.7%	31	2.2%	882	61.9%
		1995 CW	3,937	1,790	45.5%	689	17.5%	366	9.3%	122	3.1%	2,967	75.4%

Table 9. (Continued.)

Site	Year	Species ^a	Number Interrogated/Site									Grand Total Ints	Total % Obs.
			Number Tagged	Ints at Lower Granite	% GRJ	Ints at Little Goose	% GOJ	Ints at Lower Monumental	% LMJ	Ints at McNary	% MCJ		
Salmon	1994	CW	2,913	1,113	38.2%	287	9.9%	188	6.5%	202	6.9%	1,790	61.4%
	1993	CW	2,169	1,112	51.3%	286	13.2%	125	5.8%	91	4.2%	1,614	74.4%
Salmon	2000	SH	2,130	1,209	56.8%	153	7.2%	70	3.3%	21	1.0%	1,453	68.2%
	1999	SH	2,266	718	31.7%	614	27.1%	214	9.4%	32	1.4%	1,578	69.6%
	1998	SG	1,117	608	54.4%	158	14.2%	76	6.8%	7	0.6%	849	76.0%
	1997	SH	1,252	627	50.1%	213	17.0%	118	9.4%	1	0.1%	960	76.6%
	1996	SH	1,410	598	42.4%	205	14.5%	140	9.9%	24	1.7%	967	68.6%
	1995	SH	1,556	937	60.2%	190	12.2%	118	7.6%	14	0.9%	1,259	80.9%
	1994	SH	2,596	1,001	38.6%	164	6.3%	70	2.7%	36	1.4%	1,271	49.0%
	1993	SH	1,641	1,203	73.3%	112	6.8%	44	2.7%	13	0.8%	1,372	83.6%
Salmon	2000	SW	336	141	42.0%	56	16.7%	18	5.4%	5	1.5%	220	65.5%
	1999	SW	227	56	24.7%	75	33.0%	27	11.9%	5	2.2%	163	71.8%
	1998	SW	112	56	50.0%	13	11.6%	10	8.9%	1	0.9%	80	71.4%
	1997	SW	59	38	64.4%	6	10.2%	5	8.5%	0	0.0%	49	83.1%
	1996	SW	251	112	44.6%	49	19.5%	21	8.4%	1	0.4%	183	72.9%
	1995	SW	435	251	57.7%	59	13.6%	32	7.4%	1	0.2%	343	78.9%
	1994	SW	532	260	48.9%	44	8.3%	32	6.0%	10	1.9%	346	65.0%
	1993	SW	902	575	63.7%	73	8.1%	36	4.0%	5	0.6%	689	76.4%

^a CH=Hatchery chinook, CW=wild chinook, CU=unknown chinook, SH=hatchery steelhead, SW=wild steelhead.

^b Bias may as only "quality" fish were tagged.

Percent interrogation of Salmon River trap hatchery chinook salmon daily PIT tag release groups at Lower Granite Dam, after combining to remove groups with small sample size, ranged from 8.3% to 47.1% (Appendix B, Table 5). Wild chinook salmon ranged from 17.2% to 52.2% (Appendix B, Table 6). Seasonal cumulative interrogation rate of PIT-tagged hatchery chinook salmon to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 25.0% and 67.5% and averaged 54.9% (Table 9). Wild chinook salmon cumulative interrogation rates ranged from 33.3% to 83.3% and averaged 68.3% (Table 9).

Percent interrogation of Snake River trap hatchery steelhead trout and wild steelhead trout daily PIT tag release groups at Lower Granite Dam, after combining to remove groups with small sample size, ranged from 9.1% to 67.8% for hatchery fish (Appendix B, Table 3). Wild steelhead trout ranged from 7.7% to 68.8% (Appendix B, Table 4). Seasonal cumulative interrogation rate of PIT-tagged hatchery steelhead trout to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 20.0% and 87.7% and averaged 72.9% (Table 9). Wild steelhead trout cumulative interrogation rates ranged between 25.0% and 100% and averaged 71.3% (Table 9).

Percent interrogation of Salmon River trap hatchery steelhead trout daily PIT tag release groups at Lower Granite Dam, after combining to remove groups with small sample size, ranged from 20.0% to 84.9% (Appendix B, Table 7). Wild steelhead trout ranged from 22.7% to 85.7% (Appendix B, Table 8). Seasonal cumulative interrogation rate of PIT-tagged hatchery steelhead trout to Lower Granite, Little Goose, Lower Monumental, and McNary dams ranged between 37.5% and 100%, and averaged 68.2% (Table 9). Wild steelhead trout cumulative interrogation rates ranged between 25.0% and 100%, and averaged 65.5% (Table 9).

SUMMARY

Hatchery chinook salmon releases above Lower Granite Dam for 2000 were 92% of the previous year's release. Hatchery steelhead trout releases were 104% of 1999 numbers. Hatchery sockeye releases were 135% of 1999 numbers. Hatchery coho releases were 103% of last year's. Hatchery production of spring chinook salmon in the Clearwater River drainage was 67%, the Snake River and non-Idaho tributaries 30%, and the Salmon River drainage 92% of 1999 production. Hatchery production of steelhead trout in the Clearwater River drainage was 134%, the Snake River and non-Idaho tributaries was 83%, and the Salmon River was 98% of last year's total. Hatchery production of chinook salmon and steelhead trout released above Lower Granite Dam was 9,445,107 and 9,765,783, respectively, in 2000. Significant numbers of hatchery sockeye salmon (13,103) and hatchery coho salmon (812,018) were released in 2000.

The Snake River trap was operated on the east side of the river from March 13 through June 16 and was out of operation for zero days during this period due to high flow, mechanical failures, or because quotas were reached. The Snake River trap captured 5,566 age-1 hatchery chinook salmon, 2,214 wild chinook salmon, 689 wild age-0 chinook salmon, 8,777 hatchery steelhead trout, 1,364 wild steelhead trout, 40 hatchery sockeye, 92 sockeye/kokanee of unknown rearing, and 159 hatchery coho.

The Salmon River trap was operated on the east side of the river from March 13 through May 22 and was out of operation for zero days during this period due to high flow, mechanical failures, or because quotas were reached. The Salmon River trap captured 22,175 age-1

hatchery chinook salmon, 3,373 wild chinook salmon, 2,290 hatchery steelhead trout, 336 wild steelhead trout, and 41 hatchery sockeye salmon.

Significant migration rate/discharge relations were detected for hatchery and wild chinook salmon released from both traps to Lower Granite Dam. Significant migration rate/discharge relations were detected for hatchery steelhead trout released from both traps to Lower Granite Dam. Statistical analysis was unable to detect a significant migration rate/discharge relation for wild steelhead trout from the Snake River trap to Lower Granite Dam. Insufficient numbers of wild steelhead trout were PIT tagged at the Salmon River trap to estimate travel time and migration rate to Lower Granite Dam. In all instances where the migration rate/discharge relation was significant, the same trend was seen: as discharge increased, migration rate increased.

The four-dam interrogation rates for 2000 were only comparable from 1993 to 1999 because of the addition of a new collection facility at Lower Monumental Dam in 1993. The comparability between the eight years is questionable because of collection efficiency changes during the out-migration due to operational changes and spill at the dams.

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APPENDICES

Appendix A. Table 1. PIT-tagged hatchery chinook salmon travel time, with 95% confidence intervals, from the Snake River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/04/00	9.52	8.44	13.53	8.44	13.53	6	21	28.57%	81.018	5.4
04/05/00 ^b	9.41	0.00	0.00	6.48	12.34	2	11	18.18%	82.420	5.5
04/06/00	8.50	7.57	14.53	7.47	25.37	9	34	26.47%	85.710	6.1
04/07/00	8.02	6.97	8.41	4.91	14.45	12	40	30.00%	86.467	6.4
04/10/00	11.94	9.22	17.68	4.33	28.46	33	93	35.48%	97.169	4.3
04/11/00	6.61	4.45	12.43	3.45	16.69	9	50	18.00%	95.338	7.8
04/12/00	8.00	4.64	12.49	2.57	16.41	14	47	29.79%	98.689	6.4
04/13/00	8.59	6.56	10.63	2.53	24.62	31	85	36.47%	102.110	6.0
04/14/00	7.69	6.89	8.46	1.84	26.59	118	333	35.44%	103.700	6.7
04/17/00	7.84	6.12	9.15	3.20	35.26	80	200	40.00%	104.878	6.6
04/18/00	6.63	5.67	7.96	1.78	17.78	49	125	39.20%	105.663	7.8
04/19/00	7.10	5.40	12.05	2.63	16.66	26	55	47.27%	105.825	7.3
04/20/00	6.41	5.55	8.50	1.67	31.54	56	121	46.28%	106.471	8.0
04/21/00	6.26	4.55	7.73	2.35	17.75	46	101	45.54%	104.629	8.2
04/24/00	7.63	6.72	8.65	2.45	16.66	85	201	42.29%	96.589	6.8
04/25/00	7.44	6.49	8.47	3.42	14.71	35	100	35.00%	95.038	6.9
04/26/00	6.62	5.65	7.71	3.26	15.66	45	115	39.13%	94.313	7.8
04/27/00	5.77	5.13	7.17	2.54	11.98	36	99	36.36%	93.800	8.9
04/28/00	6.12	4.80	7.85	3.62	16.54	31	86	36.05%	94.600	8.4
05/01/00	4.95	4.48	6.58	1.71	10.62	40	102	39.22%	95.550	10.4
05/02/00	5.50	4.13	5.64	2.57	9.50	35	89	39.33%	93.529	9.4
05/03/00	4.56	4.00	5.58	2.51	7.68	33	76	43.42%	93.417	11.3
05/04/00	4.55	3.90	4.92	1.70	17.03	72	179	40.22%	90.083	11.3
05/05/00	5.00	4.34	5.66	2.56	14.66	55	155	35.48%	87.233	10.3
05/08/00	6.58	4.58	9.78	3.60	14.21	17	57	29.82%	76.500	7.8
05/09/00 ^b	5.00	0.00	0.00	2.46	8.76	5	18	27.78%	76.517	10.3
05/10/00	5.07	4.44	10.55	4.44	10.55	6	20	30.00%	75.433	10.2
05/11/00 ^b	3.62	0.00	0.00	3.50	3.85	5	20	25.00%	74.460	14.2
05/12/00 ^b	3.20	0.00	0.00	3.20	3.20	1	11	9.09%	72.700	16.2
05/15/00 ^b	10.78	0.00	0.00	10.78	10.78	1	3	33.33%	80.317	4.8
05/16/00 ^b	2.92	0.00	0.00	2.38	3.53	3	4	75.00%	68.150	17.7
05/18/00 ^b	2.98	0.00	0.00	2.98	2.98	1	1	100.00%	74.700	17.3
05/19/00 ^b	1.76	0.00	0.00	1.76	1.76	1	10	10.00%	76.200	29.3
05/22/00 ^b	2.67	0.00	0.00	1.68	2.79	3	15	20.00%	93.925	19.4
05/23/00	5.86	2.53	14.23	1.55	36.68	17	106	16.04%	91.629	8.8
05/24/00	14.13	4.49	21.08	1.70	36.16	32	167	19.16%	84.133	3.7
05/25/00	11.52	4.54	21.73	1.77	32.98	20	102	19.61%	83.054	4.5
05/26/00	21.33	5.11	29.14	3.84	33.42	13	138	9.42%	78.545	2.4
05/29/00	11.61	8.65	18.99	2.79	30.17	19	202	9.41%	79.431	4.4
05/30/00	17.77	8.71	25.36	7.69	29.91	11	54	20.37%	75.805	2.9
05/31/00 ^b	16.92	0.00	0.00	6.88	28.19	4	21	19.05%	75.250	3.1
06/01/00	16.25	8.95	27.13	4.55	28.30	9	82	10.98%	74.612	3.2
06/02/00 ^b	13.48	0.00	0.00	5.14	26.52	4	44	9.09%	74.393	3.8
06/05/00	13.76	3.51	24.52	3.51	24.52	7	44	15.91%	72.593	3.7
06/06/00 ^b	8.48	0.00	0.00	8.14	8.83	2	28	7.14%	74.422	6.1
06/07/00	14.86	8.13	19.71	6.68	22.66	11	61	18.03%	68.563	3.5
06/08/00	18.57	6.77	20.76	5.35	22.18	13	58	22.41%	61.640	2.8
06/09/00 ^b	5.91	0.00	0.00	4.41	15.44	5	22	22.73%	70.829	8.7
06/12/00 ^b	15.35	0.00	0.00	13.80	16.90	2	23	8.70%	58.844	3.4
06/14/00 ^b	12.76	0.00	0.00	11.68	14.15	3	23	13.04%	57.871	4.0
06/16/00	5.52	3.10	12.45	3.10	12.45	6	75	8.00%	61.929	9.4

^a Confidence intervals calculated with non parametric statistics

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 2. PIT-tagged wild chinook salmon travel time, with 95% confidence intervals, from the Snake River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/04/00	10.20	9.37	12.58	9.37	12.58	7	25	28.00%	81.018	5.1
04/05/00 ^b	13.59	0.00	0.00	13.59	13.59	1	3	33.33%	88.773	3.8
04/06/00	7.93	4.83	9.67	4.83	9.67	8	23	34.78%	83.144	6.5
04/07/00	7.10	5.89	17.80	5.61	23.54	9	26	34.62%	83.675	7.3
04/10/00	5.22	4.73	8.51	3.61	12.54	32	133	24.06%	90.650	9.9
04/11/00	7.47	4.97	9.49	3.68	17.45	23	59	38.98%	95.338	6.9
04/12/00	8.49	4.39	9.93	3.44	13.63	15	42	35.71%	98.689	6.1
04/13/00	4.31	2.88	12.30	2.88	12.30	8	39	20.51%	100.500	12.0
04/14/00	5.80	4.38	6.57	2.41	14.97	30	106	28.30%	102.471	8.9
04/17/00	5.43	5.08	6.07	3.66	15.50	59	202	29.21%	102.867	9.5
04/18/00	5.15	3.76	6.96	3.69	11.47	10	59	16.95%	105.767	10.0
04/19/00	4.64	3.57	7.58	3.40	15.37	14	41	34.15%	107.833	11.1
04/20/00	4.46	3.83	5.68	2.46	9.35	27	82	32.93%	109.140	11.6
04/21/00	5.42	4.27	7.68	2.44	13.52	19	55	34.55%	106.767	9.5
04/24/00	5.37	4.71	5.59	2.45	11.40	61	160	38.13%	99.150	9.6
04/25/00	4.93	4.41	5.70	3.38	16.71	28	94	29.79%	95.950	10.5
04/26/00	5.56	4.47	7.08	2.40	13.42	27	102	26.47%	94.086	9.3
04/27/00	4.92	4.56	6.46	3.53	8.45	17	59	28.81%	93.450	10.5
04/28/00	5.37	2.77	8.88	2.77	8.88	8	22	36.36%	94.133	9.6
05/01/00	3.47	3.18	6.73	3.17	18.66	10	31	32.26%	94.475	14.9
05/02/00	4.54	3.25	7.67	2.74	8.41	11	28	39.29%	95.200	11.4
05/03/00	4.48	3.42	5.46	2.52	27.62	11	30	36.67%	95.400	11.5
05/04/00	4.14	3.39	5.91	3.39	5.91	6	20	30.00%	92.920	12.5
05/05/00	4.67	3.76	5.54	2.62	6.51	24	55	43.64%	87.233	11.0
05/08/00	4.69	2.96	6.49	2.71	6.53	9	26	34.62%	78.733	11.0
05/09/00 ^b	6.04	0.00	0.00	3.57	8.52	2	12	16.67%	75.500	8.5
05/10/00 ^b	4.09	0.00	0.00	2.54	5.83	4	11	36.36%	76.640	12.6
05/11/00 ^b	5.58	0.00	0.00	4.64	6.53	2	9	22.22%	71.657	9.2
05/12/00 ^b	6.46	0.00	0.00	4.90	12.64	3	9	33.33%	70.043	8.0
05/15/00 ^b	8.69	0.00	0.00	8.69	8.69	1	1	100.00%	78.130	5.9
05/17/00 ^b	13.54	0.00	0.00	13.54	13.54	1	1	100.00%	84.420	3.8
05/22/00	15.39	2.57	37.68	2.57	37.68	7	30	23.33%	85.219	3.4
05/23/00	2.33	1.65	3.02	1.50	3.63	9	17	52.94%	95.600	22.2
05/24/00	7.34	3.42	16.29	1.50	37.09	15	95	15.79%	89.350	7.0
05/25/00	27.51	3.45	36.18	3.42	36.31	9	80	11.25%	75.059	1.9
05/26/00 ^b	5.18	0.00	0.00	4.23	6.14	2	5	40.00%	87.750	10.0
05/29/00	28.74	18.11	31.10	8.46	31.86	11	139	7.91%	68.037	1.8
05/30/00	25.44	8.69	27.76	8.30	30.08	10	50	20.00%	70.112	2.0

^a Confidence intervals calculated with non parametric statistics.

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 3. PIT-tagged hatchery steelhead trout travel time, with 95% confidence intervals, from the Snake River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/04/00 ^b	2.84	0.00	0.00	2.83	3.00	4	10	40.00%	75.375	18.1
04/05/00 ^b	2.32	0.00	0.00	2.32	2.32	1	11	9.09%	78.167	22.3
04/06/00	2.97	2.20	3.43	2.20	3.43	6	18	33.33%	78.300	17.3
04/07/00	4.06	2.87	6.07	2.71	7.39	10	24	41.67%	78.660	12.7
04/10/00	3.14	2.62	3.77	2.38	4.50	18	27	66.67%	82.475	16.4
04/11/00	2.62	2.48	3.07	1.88	4.94	17	28	60.71%	89.150	19.7
04/12/00	2.46	2.12	2.67	1.45	8.03	25	49	51.02%	92.033	21.0
04/13/00	1.75	1.56	2.15	1.43	2.62	19	39	48.72%	100.600	29.6
04/14/00	1.83	1.63	1.91	1.53	2.78	16	46	34.78%	105.367	28.2
04/17/00	2.34	2.09	2.47	1.48	20.64	73	138	52.90%	98.833	22.0
04/18/00	1.84	1.69	2.41	1.44	5.89	21	42	50.00%	100.867	28.0
04/19/00	1.83	1.65	2.54	1.50	2.86	16	28	57.14%	104.167	28.1
04/20/00	1.75	1.72	1.85	1.47	8.64	66	106	62.26%	106.900	29.4
04/21/00	1.52	1.46	1.56	1.30	3.76	104	238	43.70%	110.667	34.0
04/24/00	1.75	1.69	1.84	1.28	23.08	111	200	55.50%	102.867	29.5
04/25/00	2.76	2.66	2.90	1.66	14.73	61	102	59.80%	96.800	18.7
04/26/00	2.59	2.49	2.69	1.69	5.32	54	102	52.94%	96.050	19.9
04/27/00	1.81	1.73	2.45	1.51	5.78	53	100	53.00%	95.433	28.5
04/28/00	2.57	1.94	2.74	1.45	14.52	49	96	51.04%	93.675	20.1
05/01/00	1.85	1.75	2.41	1.41	22.01	135	199	67.84%	93.500	27.8
05/02/00	2.69	2.54	2.78	1.79	7.87	60	99	60.61%	97.075	19.2
05/03/00	1.88	1.78	2.39	1.34	5.20	66	100	66.00%	98.033	27.4
05/04/00	1.75	1.67	1.78	1.39	4.48	63	102	61.76%	97.600	29.5
05/05/00	1.70	1.66	1.81	1.43	3.60	61	99	61.62%	94.567	30.4
05/08/00	2.53	2.49	2.61	1.60	7.43	119	181	65.75%	80.300	20.4
05/09/00	2.48	2.09	2.73	1.59	10.96	86	166	51.81%	79.233	20.8
05/10/00	2.02	1.81	2.56	1.44	11.91	95	170	55.88%	80.033	25.5
05/11/00	3.22	2.54	3.72	1.56	4.75	29	51	56.86%	75.725	16.0
05/12/00	2.88	2.72	3.59	2.49	13.01	29	58	50.00%	72.700	17.9
05/15/00	3.48	2.92	3.81	1.90	8.77	42	80	52.50%	67.225	14.8
05/16/00	3.35	2.82	4.88	1.75	9.52	31	53	58.49%	68.150	15.4
05/17/00	2.70	2.56	2.97	1.56	9.55	56	87	64.37%	71.125	19.1
05/18/00	2.58	2.20	2.73	1.43	9.74	177	287	61.67%	74.700	20.0
05/19/00	2.73	2.16	2.93	1.51	10.22	62	92	67.39%	79.375	18.9
05/22/00	1.78	1.67	2.03	1.54	4.04	15	24	62.50%	94.600	28.9
05/23/00	2.00	1.76	2.23	1.35	5.81	116	178	65.17%	95.600	25.8
05/24/00	2.36	2.22	2.57	1.56	6.75	71	110	64.55%	92.967	21.9
05/25/00	2.56	2.35	2.71	1.71	7.70	55	94	58.51%	89.325	20.1
05/26/00	2.47	2.41	2.63	1.66	3.81	25	43	58.14%	88.467	20.9
05/29/00 ^b	2.28	0.00	0.00	1.61	4.04	5	35	14.29%	87.033	22.7

^a Confidence intervals calculated with non parametric statistics.

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 4. PIT-tagged wild steelhead trout travel time, with 95% confidence intervals, from the Snake River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
04/04/00 ^b	2.97	0.00	0.00	2.44	10.30	3	5	60.00%	75.375	17.4
04/05/00 ^b	3.36	0.00	0.00	3.36	3.36	1	13	7.69%	78.150	15.4
04/06/00 ^b	3.84	0.00	0.00	1.84	13.46	5	19	26.32%	78.340	13.4
04/07/00 ^b	7.02	0.00	0.00	2.12	7.22	3	12	25.00%	83.675	7.4
04/10/00	2.70	2.56	3.66	2.56	3.66	8	30	26.67%	82.475	19.1
04/11/00	3.41	2.44	3.76	2.32	7.93	11	16	68.75%	89.150	15.1
04/12/00	2.42	2.34	29.40	2.34	29.40	6	15	40.00%	92.033	21.3
04/13/00	1.80	1.56	2.03	1.56	2.03	7	15	46.67%	100.600	28.7
04/14/00	1.71	1.57	2.13	1.44	2.51	13	36	36.11%	105.367	30.2
04/17/00	2.33	2.31	2.51	1.59	3.62	35	102	34.31%	98.833	22.1
04/18/00	1.75	1.63	2.50	1.54	3.45	11	29	37.93%	100.867	29.6
04/19/00	1.75	1.54	2.52	1.49	7.03	11	19	57.89%	104.167	29.5
04/20/00	1.73	1.62	2.04	1.51	2.43	21	38	55.26%	106.900	29.8
04/21/00 ^b	1.73	0.00	0.00	1.51	2.36	4	15	26.67%	110.667	29.8
04/24/00	1.79	1.68	2.35	1.47	5.28	50	105	47.62%	102.867	28.8
04/25/00	2.75	2.45	3.31	1.61	16.48	21	44	47.73%	96.800	18.7
04/26/00	2.37	2.31	2.47	1.65	4.04	33	64	51.56%	95.167	21.7
04/27/00	2.02	1.62	2.55	1.50	4.42	36	72	50.00%	95.433	25.5
04/28/00	2.48	2.35	2.61	1.48	9.10	45	94	47.87%	94.767	20.8
05/01/00	1.72	1.62	2.24	1.49	4.44	29	53	54.72%	93.500	30.0
05/02/00	2.57	1.76	2.67	1.71	3.45	13	33	39.39%	97.075	20.1
05/03/00	2.05	1.65	2.36	1.57	3.33	24	38	63.16%	98.033	25.2
05/04/00	1.75	1.58	2.35	1.45	3.46	31	62	50.00%	97.600	29.4
05/05/00	2.28	1.89	2.45	1.38	3.44	35	68	51.47%	94.567	22.6
05/08/00	2.42	2.19	2.88	1.49	3.78	12	28	42.86%	79.900	21.3
05/09/00	2.63	1.82	3.81	1.82	3.81	8	19	42.11%	79.000	19.6
05/10/00	1.90	1.70	2.45	1.55	4.36	9	22	40.91%	80.033	27.1
05/11/00	2.94	2.51	3.51	1.59	4.75	16	39	41.03%	75.725	17.6
05/12/00	2.60	2.53	3.58	2.53	4.30	12	23	52.17%	72.700	19.8
05/15/00 ^b	2.73	0.00	0.00	2.73	2.73	1	12	8.33%	67.225	18.9
05/16/00 ^b	3.87	0.00	0.00	3.63	4.10	2	5	40.00%	69.700	13.3
05/17/00	2.63	1.71	5.40	1.71	5.40	7	16	43.75%	71.125	19.6
05/18/00	1.78	1.52	5.11	1.52	5.11	8	27	29.63%	73.067	28.9
05/19/00	2.47	1.81	2.90	1.65	3.82	15	36	41.67%	76.200	20.9
05/22/00 ^b	1.72	0.00	0.00	1.64	1.74	4	7	57.14%	94.600	30.1
05/23/00	2.04	1.63	2.21	1.47	4.47	15	28	53.57%	95.600	25.2
05/24/00	2.34	2.12	2.56	1.62	3.38	12	23	52.17%	92.967	22.1
05/25/00	2.34	1.68	3.83	1.68	3.83	8	15	53.33%	90.100	22.1
05/26/00 ^b	2.17	0.00	0.00	1.76	2.50	4	14	28.57%	88.467	23.8

^a Confidence intervals calculated with non parametric statistics

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 5. PIT-tagged chinook salmon travel time, with 95% confidence intervals, from the Salmon River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/13/00	35.29	33.49	39.06	23.43	49.12	35	120	29.17%	65.367	6.6
03/14/00	36.35	33.71	38.96	27.39	47.49	37	150	24.67%	67.511	6.4
03/15/00	36.88	31.39	38.09	22.73	47.17	22	140	15.71%	69.929	6.3
03/16/00	35.50	29.46	37.38	26.65	40.50	18	100	18.00%	70.378	6.6
03/17/00	36.77	29.12	44.03	27.39	50.07	20	90	22.22%	73.108	6.4
03/20/00	39.00	34.43	43.34	24.79	47.65	29	120	24.17%	78.040	6.0
03/21/00	31.65	26.49	39.40	22.15	49.09	32	120	26.67%	74.491	7.4
03/22/00	34.57	33.40	37.31	21.81	51.98	38	121	31.40%	78.772	6.8
03/23/00	38.42	28.64	39.53	20.42	49.67	33	140	23.57%	81.187	6.1
03/24/00	32.49	29.35	35.99	20.26	41.44	28	100	28.00%	80.139	7.2
03/27/00	31.44	29.40	35.55	16.27	46.66	38	120	31.67%	83.663	7.4
03/28/00	32.41	28.56	35.62	16.23	44.08	37	120	30.83%	85.470	7.2
03/29/00	33.61	29.70	35.67	16.40	44.41	48	120	40.00%	86.860	7.0
03/30/00	35.40	33.50	36.60	15.69	43.57	41	120	34.17%	88.236	6.6
03/31/00	32.68	29.92	36.05	16.67	50.51	46	124	37.10%	88.865	7.1
04/03/00	22.47	18.54	29.71	10.75	41.56	24	87	27.59%	91.548	10.4
04/04/00	24.83	24.18	27.85	9.87	45.71	54	162	33.33%	93.469	9.4
04/05/00	27.76	26.56	29.73	10.72	40.04	42	119	35.29%	94.259	8.4
04/06/00	27.23	23.53	28.44	10.12	43.55	47	120	39.17%	94.914	8.6
04/07/00	26.52	21.99	28.81	9.66	40.19	31	111	27.93%	95.575	8.8
04/10/00	21.73	20.81	26.65	5.64	50.72	37	121	30.58%	97.761	10.8
04/11/00	23.54	19.79	26.71	7.49	40.57	39	120	32.50%	98.564	9.9
04/12/00	21.98	20.53	23.75	9.78	40.10	55	140	39.29%	99.252	10.6
04/13/00	18.50	17.42	21.11	9.05	41.91	51	145	35.17%	100.320	12.6
04/14/00	22.83	16.65	25.82	11.56	31.82	24	75	32.00%	99.817	10.2
04/17/00	17.29	14.55	18.56	5.87	35.53	36	118	30.51%	99.767	13.5
04/18/00	15.95	13.50	16.68	5.17	24.68	42	122	34.43%	99.835	14.7
04/19/00	12.79	10.48	15.60	5.21	21.95	51	120	42.50%	100.521	18.3
04/20/00	14.83	12.80	17.82	5.60	22.80	32	121	26.45%	100.006	15.8
04/21/00	14.57	12.83	15.69	5.66	31.79	51	119	42.86%	99.375	16.0
04/24/00	14.44	12.71	15.78	6.60	31.85	44	120	36.67%	95.320	16.2
04/25/00	14.95	13.69	17.58	7.09	29.51	44	120	36.67%	92.313	15.6
04/26/00	14.21	12.51	16.64	7.69	26.89	40	140	28.57%	91.687	16.4
04/27/00	13.16	12.41	15.07	7.83	26.72	34	120	28.33%	91.243	17.8
04/28/00	12.57	9.57	16.35	6.77	25.54	16	73	21.92%	90.507	18.6
05/01/00	9.49	7.91	11.43	5.61	22.53	36	121	29.75%	90.130	24.6
05/02/00	10.70	8.45	16.72	4.28	24.46	29	98	29.59%	86.967	21.8
05/03/00	10.73	8.94	11.71	4.52	23.49	41	119	34.45%	84.967	21.8
05/04/00	15.54	11.74	16.63	3.51	23.63	35	105	33.33%	78.918	15.0
05/05/00	14.28	10.71	20.25	6.49	25.60	20	73	27.40%	77.887	16.4
05/08/00 ^b	16.06	0.00	0.00	13.55	18.57	2	12	16.67%	77.876	14.5
05/09/00	14.41	8.48	17.62	8.48	17.62	8	17	47.06%	76.267	16.2
05/10/00 ^b	14.49	0.00	0.00	5.49	15.58	4	18	22.22%	77.633	16.1
05/11/00 ^b	12.60	0.00	0.00	8.77	13.72	4	14	28.57%	77.443	18.5
05/12/00 ^b	9.75	0.00	0.00	9.75	9.75	1	12	8.33%	73.436	24.0
05/16/00	6.47	4.74	12.45	4.74	12.45	7	22	31.82%	73.857	36.1
05/22/00 ^b	4.61	0.00	0.00	4.54	4.86	3	13	23.08%	92.350	50.7

^a Confidence intervals calculated with non parametric statistics

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix A. Table 6. PIT-tagged wild chinook travel time, with 95% confidence intervals, from the Salmon River Trap to Lower Granite Dam, 2000.

Release Date	Median Travel Time	Lower Confidence Interval ^a	Upper Confidence Level ^a	Minimum Travel Time	Maximum Travel Time	Number Recaptured	Number Tagged	Percent Recaptured	Mean Discharge	Migration Rate (km/day)
03/27/00	18.66	17.55	25.66	17.55	25.66	7	38	18.42%	72.075	12.5
03/28/00	17.14	15.44	17.45	13.83	23.68	15	57	26.32%	71.194	13.6
03/29/00	16.48	15.39	23.32	14.57	55.52	12	40	30.00%	72.159	14.2
03/30/00	15.43	14.60	26.25	11.98	46.24	13	40	32.50%	73.113	15.1
03/31/00	14.75	8.61	26.70	8.61	26.70	8	40	20.00%	76.306	15.8
04/03/00	11.58	11.09	13.50	8.91	28.73	26	77	33.77%	81.508	20.2
04/04/00	10.76	10.51	11.63	8.57	49.11	63	173	36.42%	83.333	21.7
04/05/00	10.52	10.12	15.85	7.84	32.59	53	147	36.05%	86.258	22.2
04/06/00	15.62	14.68	17.50	7.25	43.09	39	144	27.08%	92.729	15.0
04/07/00	13.37	9.65	20.96	6.86	31.68	20	60	33.33%	91.536	17.5
04/10/00	15.93	10.96	20.64	5.54	40.49	35	120	29.17%	99.282	14.7
04/11/00	11.68	10.78	14.30	4.57	44.46	47	140	33.57%	100.054	20.0
04/12/00	10.83	9.74	13.54	4.77	42.79	40	140	28.57%	101.683	21.6
04/13/00	13.52	11.36	20.44	6.10	41.70	33	120	27.50%	103.033	17.3
04/14/00	11.42	7.81	14.52	6.31	25.70	17	60	28.33%	105.000	20.5
04/17/00	10.97	8.40	12.54	5.65	39.44	29	63	46.03%	102.450	21.3
04/18/00	10.10	7.43	10.90	5.78	14.76	25	80	31.25%	102.800	23.1
04/19/00	9.58	7.15	11.43	6.26	14.53	9	40	22.50%	102.991	24.4
04/20/00	10.44	5.86	13.58	4.30	19.92	11	40	27.50%	101.945	22.4
04/21/00	8.59	6.92	12.72	4.72	35.33	21	42	50.00%	101.670	27.2
04/24/00	8.73	7.25	10.38	4.92	30.70	24	46	52.17%	96.520	26.8
04/25/00	10.64	9.20	14.58	5.57	16.58	10	40	25.00%	95.750	22.0
04/26/00	14.96	7.92	18.88	5.53	30.51	16	52	30.77%	91.050	15.6
04/27/00	11.20	8.71	17.46	7.13	27.70	12	40	30.00%	93.433	20.9
04/28/00 ^b	7.83	0.00	0.00	7.60	9.72	3	11	27.27%	95.289	29.8
05/01/00	7.52	5.89	13.49	5.80	13.62	11	40	27.50%	91.222	31.1
05/02/00 ^b	6.77	0.00	0.00	6.40	18.45	4	9	44.44%	91.325	34.5
05/03/00 ^b	8.75	0.00	0.00	4.66	10.94	5	14	35.71%	87.650	26.7
05/04/00 ^b	8.58	0.00	0.00	6.61	13.84	5	29	17.24%	85.350	27.2
05/05/00	9.57	7.60	18.84	7.30	19.81	11	40	27.50%	81.427	24.4
05/08/00 ^b	13.98	0.00	0.00	10.76	16.56	3	6	50.00%	75.267	16.7
05/09/00	15.24	8.94	15.54	8.94	15.54	6	17	35.29%	77.525	15.3
05/10/00 ^b	16.39	0.00	0.00	13.58	17.70	4	13	30.77%	79.235	14.3
05/11/00 ^b	15.16	0.00	0.00	14.59	15.74	2	9	22.22%	79.169	15.4
05/12/00	12.10	6.76	16.22	6.76	16.22	6	14	42.86%	77.131	19.3
05/16/00 ^b	8.41	0.00	0.00	5.77	9.42	4	13	30.77%	79.100	27.8
05/22/00 ^b	5.06	0.00	0.00	4.47	5.70	5	13	38.46%	92.350	46.1

^a Confidence intervals calculated with non parametric statistics.

^b Not used in statistical analysis because analysis showed too few recaptures.

Appendix B. Table 1. PIT-tagged hatchery chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/00	21	6	28.57%	3	14.29%	2	9.52%	1	4.76%	12	57.14%
04/05/00	11	2	18.18%	4	36.36%	1	9.09%	2	18.18%	9	81.82%
04/06/00	34	9	26.47%	8	23.53%	2	5.88%	3	8.82%	22	64.71%
04/07/00	40	12	30.00%	11	27.50%	3	7.50%	1	2.50%	27	67.50%
04/10/00	93	33	35.48%	20	21.51%	13	13.98%	4	4.30%	70	75.27%
04/11/00	50	9	18.00%	20	40.00%	6	12.00%	5	10.00%	40	80.00%
04/12/00	47	14	29.79%	13	27.66%	6	12.77%	1	2.13%	34	72.34%
04/13/00	85	31	36.47%	27	31.76%	5	5.88%	3	3.53%	66	77.65%
04/14/00	333	118	35.44%	72	21.62%	25	7.51%	17	5.11%	232	69.67%
04/17/00	200	80	40.00%	42	21.00%	10	5.00%	9	4.50%	141	70.50%
04/18/00	125	49	39.20%	38	30.40%	4	3.20%	6	4.80%	97	77.60%
04/19/00	55	26	47.27%	13	23.64%	3	5.45%	2	3.64%	44	80.00%
04/20/00	121	56	46.28%	26	21.49%	3	2.48%	6	4.96%	91	75.21%
04/21/00	101	46	45.54%	22	21.78%	5	4.95%	4	3.96%	77	76.24%
04/24/00	201	85	42.29%	33	16.42%	6	2.99%	11	5.47%	135	67.16%
04/25/00	100	35	35.00%	13	13.00%	6	6.00%	9	9.00%	63	63.00%
04/26/00	115	45	39.13%	18	15.65%	6	5.22%	7	6.09%	76	66.09%
04/27/00	99	36	36.36%	9	9.09%	7	7.07%	5	5.05%	57	57.58%
04/28/00	86	31	36.05%	7	8.14%	1	1.16%	8	9.30%	47	54.65%
05/01/00	102	40	39.22%	13	12.75%	4	3.92%	7	6.86%	64	62.75%
05/02/00	89	35	39.33%	11	12.36%	6	6.74%	1	1.12%	53	59.55%
05/03/00	76	33	43.42%	12	15.79%	4	5.26%	2	2.63%	51	67.11%
05/04/00	179	72	40.22%	24	13.41%	9	5.03%	5	2.79%	110	61.45%
05/05/00	155	55	35.48%	17	10.97%	1	0.65%	13	8.39%	86	55.48%
05/08/00	57	17	29.82%	8	14.04%	5	8.77%	3	5.26%	33	57.89%
05/09/00	18	5	27.78%	2	11.11%	1	5.56%	1	5.56%	9	50.00%
05/10/00	20	6	30.00%	2	10.00%		0.00%	1	5.00%	9	45.00%
05/11/00	20	5	25.00%	1	5.00%	1	5.00%		0.00%	7	35.00%
05/12/00	11	1	9.09%	2	18.18%		0.00%		0.00%	3	27.27%
05/15/00	3	1	33.33%		0.00%	1	33.33%	1	33.33%	3	100.00%
05/16/00	4	3	75.00%	1	25.00%		0.00%		0.00%	4	100.00%
05/17/00	2		0.00%		0.00%		0.00%		0.00%	0	0.00%
05/18/00	1	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
05/19/00	10	1	10.00%	2	20.00%		0.00%		0.00%	3	30.00%
05/22/00	15	3	20.00%	3	20.00%	2	13.33%	1	6.67%	9	60.00%
05/23/00	106	17	16.04%	20	18.87%	3	2.83%	9	8.49%	49	46.23%
05/24/00	167	32	19.16%	30	17.96%	6	3.59%	8	4.79%	76	45.51%
05/25/00	102	20	19.61%	15	14.71%	4	3.92%	8	7.84%	47	46.08%
05/26/00	138	13	9.42%	22	15.94%	4	2.90%	2	1.45%	41	29.71%
05/29/00	202	19	9.41%	27	13.37%	5	2.48%	11	5.45%	62	30.69%
05/30/00	54	11	20.37%	7	12.96%	2	3.70%	2	3.70%	22	40.74%
05/31/00	21	4	19.05%		0.00%		0.00%	1	4.76%	5	23.81%
06/01/00	82	9	10.98%	8	9.76%	2	2.44%	6	7.32%	25	30.49%
06/02/00	44	4	9.09%	8	18.18%	1	2.27%	2	4.55%	15	34.09%
06/05/00	44	7	15.91%	6	13.64%	3	6.82%		0.00%	16	36.36%
06/06/00	28	2	7.14%	1	3.57%		0.00%	1	3.57%	4	14.29%
06/07/00	61	11	18.03%	10	16.39%	2	3.28%	4	6.56%	27	44.26%
06/08/00	58	13	22.41%	6	10.34%	4	6.90%	2	3.45%	25	43.10%
06/09/00	22	5	22.73%	5	22.73%		0.00%		0.00%	10	45.45%
06/12/00	23	2	8.70%	2	8.70%	1	4.35%		0.00%	5	21.74%
06/13/00	7		0.00%	1	14.29%		0.00%		0.00%	1	14.29%
06/14/00	23	3	13.04%	3	13.04%	2	8.70%		0.00%	8	34.78%
06/15/00	27		0.00%	3	11.11%		0.00%		0.00%	3	11.11%
06/16/00	75	6	8.00%	6	8.00%	1	1.33%		0.00%	13	17.33%
Totals	3963	1179	29.75%	677	17.08%	188	4.74%	195	4.92%	2239	56.50%

Appendix B. Table 2. PIT-tagged wild chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/00	25	7	28.00%	10	40.00%	3	12.00%	1	4.00%	21	84.00%
04/05/00	3	1	33.33%	2	66.67%		0.00%		0.00%	3	100.00%
04/06/00	23	8	34.78%	8	34.78%	1	4.35%		0.00%	17	73.91%
04/07/00	26	9	34.62%	8	30.77%	1	3.85%		0.00%	18	69.23%
04/10/00	133	32	24.06%	58	43.61%	14	10.53%	7	5.26%	111	83.46%
04/11/00	59	23	38.98%	12	20.34%	7	11.86%	2	3.39%	44	74.58%
04/12/00	42	15	35.71%	18	42.86%	2	4.76%	1	2.38%	36	85.71%
04/13/00	39	8	20.51%	14	35.90%	8	20.51%	2	5.13%	32	82.05%
04/14/00	106	30	28.30%	30	28.30%	15	14.15%	6	5.66%	81	76.42%
04/17/00	202	59	29.21%	75	37.13%	16	7.92%	8	3.96%	158	78.22%
04/18/00	59	10	16.95%	31	52.54%	6	10.17%	3	5.08%	50	84.75%
04/19/00	41	14	34.15%	10	24.39%	2	4.88%	2	4.88%	28	68.29%
04/20/00	82	27	32.93%	23	28.05%	7	8.54%	4	4.88%	61	74.39%
04/21/00	55	19	34.55%	13	23.64%	6	10.91%	4	7.27%	42	76.36%
04/24/00	160	61	38.13%	43	26.88%	11	6.88%	7	4.38%	122	76.25%
04/25/00	94	28	29.79%	22	23.40%	5	5.32%	11	11.70%	66	70.21%
04/26/00	102	27	26.47%	17	16.67%	12	11.76%	11	10.78%	67	65.69%
04/27/00	59	17	28.81%	7	11.86%	4	6.78%	7	11.86%	35	59.32%
04/28/00	22	8	36.36%	5	22.73%		0.00%	1	4.55%	14	63.64%
05/01/00	31	10	32.26%	5	16.13%	2	6.45%	3	9.68%	20	64.52%
05/02/00	28	11	39.29%	5	17.86%	2	7.14%	1	3.57%	19	67.86%
05/03/00	30	11	36.67%	4	13.33%	4	13.33%	2	6.67%	21	70.00%
05/04/00	20	6	30.00%	1	5.00%		0.00%		0.00%	7	35.00%
05/05/00	55	24	43.64%	3	5.45%	3	5.45%	3	5.45%	33	60.00%
05/08/00	26	9	34.62%	5	19.23%	1	3.85%	2	7.69%	17	65.38%
05/09/00	12	2	16.67%	1	8.33%	1	8.33%		0.00%	4	33.33%
05/10/00	11	4	36.36%	2	18.18%		0.00%	1	9.09%	7	63.64%
05/11/00	9	2	22.22%		0.00%	1	11.11%	1	11.11%	4	44.44%
05/12/00	9	3	33.33%	3	33.33%	2	22.22%		0.00%	8	88.89%
05/15/00	1	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
05/16/00	1		0.00%	1	100.00%		0.00%		0.00%	1	100.00%
05/17/00	1	1	100.00%		0.00%		0.00%		0.00%	1	100.00%
05/18/00	2		0.00%		0.00%		0.00%	1	50.00%	1	50.00%
05/19/00	5		0.00%	3	60.00%		0.00%		0.00%	3	60.00%
05/22/00	30	7	23.33%	3	10.00%	1	3.33%	2	6.67%	13	43.33%
05/23/00	17	9	52.94%	1	5.88%		0.00%	1	5.88%	11	64.71%
05/24/00	95	15	15.79%	19	20.00%	2	2.11%	4	4.21%	40	42.11%
05/25/00	80	9	11.25%	11	13.75%	2	2.50%	9	11.25%	31	38.75%
05/26/00	5	2	40.00%	1	20.00%		0.00%	1	20.00%	4	80.00%
05/29/00	139	11	7.91%	1	0.72%	3	2.16%	2	1.44%	17	12.23%
05/30/00	50	10	20.00%	5	10.00%		0.00%	2	4.00%	17	34.00%
Totals	1989	550	27.65%	480	24.13%	144	7.24%	112	5.63%	1286	64.66%

Appendix B. Table 3. PIT-tagged hatchery steelhead interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/00	10	4	40.00%	4	40.00%		0.00%		0.00%	8	80.00%
04/05/00	11	1	9.09%	6	54.55%	1	9.09%	1	9.09%	9	81.82%
04/06/00	18	6	33.33%	3	16.67%	3	16.67%		0.00%	12	66.67%
04/07/00	24	10	41.67%	9	37.50%	1	4.17%		0.00%	20	83.33%
04/10/00	27	18	66.67%	2	7.41%	3	11.11%		0.00%	23	85.19%
04/11/00	28	17	60.71%	4	14.29%	1	3.57%		0.00%	22	78.57%
04/12/00	49	25	51.02%	8	16.33%	3	6.12%		0.00%	36	73.47%
04/13/00	39	19	48.72%	6	15.38%	9	23.08%		0.00%	34	87.18%
04/14/00	46	16	34.78%	15	32.61%	6	13.04%		0.00%	37	80.43%
04/17/00	138	73	52.90%	16	11.59%	15	10.87%	4	2.90%	108	78.26%
04/18/00	42	21	50.00%	2	4.76%	4	9.52%		0.00%	27	64.29%
04/19/00	28	16	57.14%	2	7.14%	5	17.86%	1	3.57%	24	85.71%
04/20/00	106	66	62.26%	15	14.15%	12	11.32%		0.00%	93	87.74%
04/21/00	238	104	43.70%	50	21.01%	33	13.87%	7	2.94%	194	81.51%
04/24/00	200	111	55.50%	36	18.00%	8	4.00%	1	0.50%	156	78.00%
04/25/00	102	61	59.80%	15	14.71%	7	6.86%		0.00%	83	81.37%
04/26/00	102	54	52.94%	21	20.59%	6	5.88%	3	2.94%	84	82.35%
04/27/00	100	53	53.00%	19	19.00%	1	1.00%		0.00%	73	73.00%
04/28/00	96	49	51.04%	17	17.71%	12	12.50%		0.00%	78	81.25%
05/01/00	199	135	67.84%	16	8.04%	2	1.01%	2	1.01%	155	77.89%
05/02/00	99	60	60.61%	6	6.06%	4	4.04%		0.00%	70	70.71%
05/03/00	100	66	66.00%	7	7.00%	6	6.00%		0.00%	79	79.00%
05/04/00	102	63	61.76%	4	3.92%	6	5.88%	2	1.96%	75	73.53%
05/05/00	99	61	61.62%	5	5.05%	3	3.03%		0.00%	69	69.70%
05/08/00	181	119	65.75%	3	1.66%	4	2.21%	4	2.21%	130	71.82%
05/09/00	166	86	51.81%	5	3.01%	7	4.22%	2	1.20%	100	60.24%
05/10/00	170	95	55.88%	6	3.53%	6	3.53%	2	1.18%	109	64.12%
05/11/00	51	29	56.86%	2	3.92%	3	5.88%		0.00%	34	66.67%
05/12/00	58	29	50.00%	2	3.45%	5	8.62%	1	1.72%	37	63.79%
05/15/00	80	42	52.50%	4	5.00%	3	3.75%		0.00%	49	61.25%
05/16/00	53	31	58.49%	2	3.77%		0.00%	1	1.89%	34	64.15%
05/17/00	87	56	64.37%	6	6.90%	6	6.90%		0.00%	68	78.16%
05/18/00	287	177	61.67%	8	2.79%	11	3.83%	2	0.70%	198	68.99%
05/19/00	92	62	67.39%	4	4.35%	3	3.26%		0.00%	69	75.00%
05/22/00	24	15	62.50%	1	4.17%		0.00%		0.00%	16	66.67%
05/23/00	178	116	65.17%	4	2.25%	1	0.56%	1	0.56%	122	68.54%
05/24/00	110	71	64.55%	1	0.91%		0.00%	3	2.73%	75	68.18%
05/25/00	94	55	58.51%	3	3.19%	1	1.06%	3	3.19%	62	65.96%
05/26/00	43	25	58.14%	1	2.33%	2	4.65%	1	2.33%	29	67.44%
05/29/00	35	5	14.29%	2	5.71%		0.00%		0.00%	7	20.00%
05/31/00	4		0.00%		0.00%		0.00%		0.00%	0	0.00%
06/13/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
Totals	3717	2122	57.09%	342	9.20%	203	5.46%	41	1.10%	2708	72.85%

Appendix B. Table 4. PIT-tagged wild steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Snake River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/00	5	3	60.00%		0.00%		0.00%		0.00%	3	60.00%
04/05/00	13	1	7.69%	4	30.77%	1	7.69%	2	15.38%	8	61.54%
04/06/00	19	5	26.32%	5	26.32%	1	5.26%		0.00%	11	57.89%
04/07/00	12	3	25.00%	1	8.33%	2	16.67%	1	8.33%	7	58.33%
04/10/00	30	8	26.67%	12	40.00%	1	3.33%		0.00%	21	70.00%
04/11/00	16	11	68.75%	3	18.75%	2	12.50%		0.00%	16	100.00%
04/12/00	15	6	40.00%	5	33.33%	1	6.67%		0.00%	12	80.00%
04/13/00	15	7	46.67%	4	26.67%	1	6.67%		0.00%	12	80.00%
04/14/00	36	13	36.11%	9	25.00%	4	11.11%	1	2.78%	27	75.00%
04/17/00	102	35	34.31%	22	21.57%	13	12.75%	1	0.98%	71	69.61%
04/18/00	29	11	37.93%	4	13.79%	7	24.14%		0.00%	22	75.86%
04/19/00	19	11	57.89%	3	15.79%	2	10.53%		0.00%	16	84.21%
04/20/00	38	21	55.26%	4	10.53%	8	21.05%		0.00%	33	86.84%
04/21/00	15	4	26.67%	4	26.67%	1	6.67%	1	6.67%	10	66.67%
04/24/00	105	50	47.62%	28	26.67%	10	9.52%	1	0.95%	89	84.76%
04/25/00	44	21	47.73%	12	27.27%	4	9.09%		0.00%	37	84.09%
04/26/00	64	33	51.56%	9	14.06%	6	9.38%	2	3.13%	50	78.13%
04/27/00	72	36	50.00%	15	20.83%	6	8.33%		0.00%	57	79.17%
04/28/00	94	45	47.87%	24	25.53%	3	3.19%	2	2.13%	74	78.72%
05/01/00	53	29	54.72%	5	9.43%	5	9.43%	2	3.77%	41	77.36%
05/02/00	33	13	39.39%	3	9.09%	2	6.06%	2	6.06%	20	60.61%
05/03/00	38	24	63.16%	3	7.89%	2	5.26%	3	7.89%	32	84.21%
05/04/00	62	31	50.00%	8	12.90%	5	8.06%	1	1.61%	45	72.58%
05/05/00	68	35	51.47%	4	5.88%	6	8.82%		0.00%	45	66.18%
05/08/00	28	12	42.86%	3	10.71%	1	3.57%	3	10.71%	19	67.86%
05/09/00	19	8	42.11%	1	5.26%		0.00%	1	5.26%	10	52.63%
05/10/00	22	9	40.91%		0.00%	3	13.64%		0.00%	12	54.55%
05/11/00	39	16	41.03%		0.00%	1	2.56%	1	2.56%	18	46.15%
05/12/00	23	12	52.17%	2	8.70%	1	4.35%		0.00%	15	65.22%
05/15/00	12	1	8.33%	2	16.67%		0.00%		0.00%	3	25.00%
05/16/00	5	2	40.00%	1	20.00%		0.00%		0.00%	3	60.00%
05/17/00	16	7	43.75%	1	6.25%	1	6.25%		0.00%	9	56.25%
05/18/00	27	8	29.63%	3	11.11%	3	11.11%	1	3.70%	15	55.56%
05/19/00	36	15	41.67%	6	16.67%	2	5.56%		0.00%	23	63.89%
05/22/00	7	4	57.14%	1	14.29%		0.00%	1	14.29%	6	85.71%
05/23/00	28	15	53.57%		0.00%		0.00%	1	3.57%	16	57.14%
05/24/00	23	12	52.17%	1	4.35%		0.00%	1	4.35%	14	60.87%
05/25/00	15	8	53.33%	1	6.67%		0.00%		0.00%	9	60.00%
05/26/00	14	4	28.57%	1	7.14%		0.00%		0.00%	5	35.71%
05/31/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
Totals	1312	589	44.89%	214	16.31%	105	8.00%	28	2.13%	936	71.34%

Appendix B. Table 5. PIT-tagged hatchery chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/13/00	120	35	29.17%	15	12.50%	8	6.67%	3	2.50%	61	50.83%
03/14/00	150	37	24.67%	24	16.00%	8	5.33%	13	8.67%	82	54.67%
03/15/00	140	22	15.71%	31	22.14%	8	5.71%	7	5.00%	68	48.57%
03/16/00	100	18	18.00%	23	23.00%	3	3.00%	3	3.00%	47	47.00%
03/17/00	90	20	22.22%	14	15.56%	6	6.67%	3	3.33%	43	47.78%
03/20/00	120	29	24.17%	29	24.17%	3	2.50%	2	1.67%	63	52.50%
03/21/00	120	32	26.67%	23	19.17%	10	8.33%	5	4.17%	70	58.33%
03/22/00	121	38	31.40%	18	14.88%	10	8.26%	6	4.96%	72	59.50%
03/23/00	140	33	23.57%	21	15.00%	11	7.86%	7	5.00%	72	51.43%
03/24/00	100	28	28.00%	15	15.00%	7	7.00%	5	5.00%	55	55.00%
03/27/00	120	38	31.67%	21	17.50%	7	5.83%	6	5.00%	72	60.00%
03/28/00	120	37	30.83%	22	18.33%	4	3.33%	1	0.83%	64	53.33%
03/29/00	120	48	40.00%	22	18.33%	8	6.67%	3	2.50%	81	67.50%
03/30/00	120	41	34.17%	24	20.00%	3	2.50%	3	2.50%	71	59.17%
03/31/00	124	46	37.10%	14	11.29%	5	4.03%	5	4.03%	70	56.45%
04/03/00	87	24	27.59%	14	16.09%	7	8.05%	2	2.30%	47	54.02%
04/04/00	162	54	33.33%	34	20.99%	5	3.09%	9	5.56%	102	62.96%
04/05/00	119	42	35.29%	16	13.45%	4	3.36%	7	5.88%	69	57.98%
04/06/00	120	47	39.17%	11	9.17%	6	5.00%	5	4.17%	69	57.50%
04/07/00	111	31	27.93%	15	13.51%	9	8.11%	4	3.60%	59	53.15%
04/10/00	121	37	30.58%	17	14.05%	7	5.79%	8	6.61%	69	57.02%
04/11/00	120	39	32.50%	21	17.50%	4	3.33%	7	5.83%	71	59.17%
04/12/00	140	55	39.29%	23	16.43%	4	2.86%	3	2.14%	85	60.71%
04/13/00	145	51	35.17%	17	11.72%	8	5.52%	7	4.83%	83	57.24%
04/14/00	75	24	32.00%	7	9.33%	4	5.33%	2	2.67%	37	49.33%
04/17/00	118	36	30.51%	21	17.80%	5	4.24%	3	2.54%	65	55.08%
04/18/00	122	42	34.43%	18	14.75%	7	5.74%	8	6.56%	75	61.48%
04/19/00	120	51	42.50%	18	15.00%	3	2.50%	4	3.33%	76	63.33%
04/20/00	121	32	26.45%	21	17.36%	7	5.79%	9	7.44%	69	57.02%
04/21/00	119	51	42.86%	17	14.29%	3	2.52%	8	6.72%	79	66.39%
04/24/00	120	44	36.67%	7	5.83%	4	3.33%	8	6.67%	63	52.50%
04/25/00	120	44	36.67%	8	6.67%	3	2.50%	7	5.83%	62	51.67%
04/26/00	140	40	28.57%	11	7.86%	3	2.14%	13	9.29%	67	47.86%
04/27/00	120	34	28.33%	17	14.17%	2	1.67%	4	3.33%	57	47.50%
04/28/00	73	16	21.92%	14	19.18%		0.00%	6	8.22%	36	49.32%
05/01/00	121	36	29.75%	14	11.57%	1	0.83%	7	5.79%	58	47.93%
05/02/00	98	29	29.59%	14	14.29%	2	2.04%	5	5.10%	50	51.02%
05/03/00	119	41	34.45%	9	7.56%	3	2.52%	11	9.24%	64	53.78%
05/04/00	105	35	33.33%	12	11.43%	5	4.76%	1	0.95%	53	50.48%
05/05/00	73	20	27.40%	7	9.59%	3	4.11%	1	1.37%	31	42.47%
05/08/00	12	2	16.67%	1	8.33%	2	16.67%	1	8.33%	6	50.00%
05/09/00	17	8	47.06%	1	5.88%		0.00%		0.00%	9	52.94%
05/10/00	18	4	22.22%	1	5.56%	1	5.56%	1	5.56%	7	38.89%
05/11/00	14	4	28.57%	1	7.14%		0.00%	4	28.57%	9	64.29%
05/12/00	12	1	8.33%	1	8.33%		0.00%	1	8.33%	3	25.00%
05/15/00	1		0.00%		0.00%		0.00%	1	100.00%	1	100.00%
05/16/00	22	7	31.82%	3	13.64%	1	4.55%		0.00%	11	50.00%
05/17/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
05/22/00	13	3	23.08%	1	7.69%		0.00%	1	7.69%	5	38.46%
Totals	4804	1486	30.93%	708	14.74%	214	4.45%	230	4.79%	2638	54.91%

Appendix B. Table 6. PIT-tagged wild chinook salmon interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
03/24/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
03/27/00	38	7	18.42%	14	36.84%	3	7.89%	1	2.63%	25	65.79%
03/28/00	57	15	26.32%	17	29.82%	3	5.26%	3	5.26%	38	66.67%
03/29/00	40	12	30.00%	10	25.00%	2	5.00%	3	7.50%	27	67.50%
03/30/00	40	13	32.50%	15	37.50%		0.00%	1	2.50%	29	72.50%
03/31/00	40	8	20.00%	13	32.50%	7	17.50%		0.00%	28	70.00%
04/03/00	77	26	33.77%	22	28.57%	11	14.29%	4	5.19%	63	81.82%
04/04/00	173	63	36.42%	50	28.90%	14	8.09%	7	4.05%	134	77.46%
04/05/00	147	53	36.05%	44	29.93%	11	7.48%	3	2.04%	111	75.51%
04/06/00	144	39	27.08%	36	25.00%	18	12.50%	11	7.64%	104	72.22%
04/07/00	60	20	33.33%	15	25.00%	7	11.67%	4	6.67%	46	76.67%
04/10/00	120	35	29.17%	25	20.83%	9	7.50%	7	5.83%	76	63.33%
04/11/00	140	47	33.57%	36	25.71%	7	5.00%	2	1.43%	92	65.71%
04/12/00	140	40	28.57%	29	20.71%	11	7.86%	11	7.86%	91	65.00%
04/13/00	120	33	27.50%	32	26.67%	14	11.67%	6	5.00%	85	70.83%
04/14/00	60	17	28.33%	14	23.33%	6	10.00%	8	13.33%	45	75.00%
04/17/00	63	29	46.03%	13	20.63%		0.00%	2	3.17%	44	69.84%
04/18/00	80	25	31.25%	21	26.25%	9	11.25%	3	3.75%	58	72.50%
04/19/00	40	9	22.50%	9	22.50%	1	2.50%		0.00%	19	47.50%
04/20/00	40	11	27.50%	5	12.50%	8	20.00%	1	2.50%	25	62.50%
04/21/00	42	21	50.00%	5	11.90%	2	4.76%	2	4.76%	30	71.43%
04/24/00	46	24	52.17%	3	6.52%	2	4.35%	2	4.35%	31	67.39%
04/25/00	40	10	25.00%	5	12.50%	3	7.50%	1	2.50%	19	47.50%
04/26/00	52	16	30.77%	5	9.62%	4	7.69%	4	7.69%	29	55.77%
04/27/00	40	12	30.00%	11	27.50%	1	2.50%	3	7.50%	27	67.50%
04/28/00	11	3	27.27%	1	9.09%	1	9.09%		0.00%	5	45.45%
05/01/00	40	11	27.50%	11	27.50%	1	2.50%	3	7.50%	26	65.00%
05/02/00	9	4	44.44%	1	11.11%	1	11.11%		0.00%	6	66.67%
05/03/00	14	5	35.71%	2	14.29%	1	7.14%	2	14.29%	10	71.43%
05/04/00	29	5	17.24%	6	20.69%	1	3.45%	2	6.90%	14	48.28%
05/05/00	40	11	27.50%	9	22.50%	2	5.00%		0.00%	22	55.00%
05/08/00	6	3	50.00%	2	33.33%		0.00%		0.00%	5	83.33%
05/09/00	17	6	35.29%	4	23.53%		0.00%	2	11.76%	12	70.59%
05/10/00	13	4	30.77%	1	7.69%	1	7.69%	2	15.38%	8	61.54%
05/11/00	9	2	22.22%		0.00%		0.00%	1	11.11%	3	33.33%
05/12/00	14	6	42.86%	2	14.29%	1	7.14%	1	7.14%	10	71.43%
05/15/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
05/16/00	13	4	30.77%	4	30.77%		0.00%	1	7.69%	9	69.23%
05/22/00	13	5	38.46%	2	15.38%	1	7.69%		0.00%	8	61.54%
Totals	2069	654	31.61%	494	23.88%	163	7.88%	103	4.98%	1414	68.34%

Appendix B. Table 7. PIT-tagged hatchery steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/06/00	7	5	71.43%		0.00%		0.00%		0.00%	5	71.43%
04/07/00	5	1	20.00%	1	20.00%	1	20.00%		0.00%	3	60.00%
04/10/00	12	5	41.67%	1	8.33%	3	25.00%		0.00%	9	75.00%
04/11/00	12	7	58.33%	3	25.00%		0.00%		0.00%	10	83.33%
04/12/00	9	5	55.56%	1	11.11%		0.00%		0.00%	6	66.67%
04/13/00	22	11	50.00%	3	13.64%		0.00%	1	4.55%	15	68.18%
04/14/00	4	1	25.00%		0.00%		0.00%	1	25.00%	2	50.00%
04/17/00	12	9	75.00%	2	16.67%	1	8.33%		0.00%	12	100.00%
04/18/00	27	20	74.07%	1	3.70%	3	11.11%		0.00%	24	88.89%
04/19/00	113	51	45.13%	17	15.04%	12	10.62%		0.00%	80	70.80%
04/20/00	107	47	43.93%	28	26.17%	9	8.41%	1	0.93%	85	79.44%
04/21/00	70	34	48.57%	11	15.71%	4	5.71%	1	1.43%	50	71.43%
04/24/00	35	19	54.29%	5	14.29%		0.00%		0.00%	24	68.57%
04/25/00	79	39	49.37%	12	15.19%	2	2.53%		0.00%	53	67.09%
04/26/00	63	34	53.97%	6	9.52%	2	3.17%	1	1.59%	43	68.25%
04/27/00	237	149	62.87%	16	6.75%	4	1.69%	4	1.69%	173	73.00%
04/28/00	187	110	58.82%	12	6.42%	4	2.14%	1	0.53%	127	67.91%
05/01/00	246	147	59.76%	11	4.47%	9	3.66%	4	1.63%	171	69.51%
05/02/00	102	71	69.61%	1	0.98%	2	1.96%	2	1.96%	76	74.51%
05/03/00	22	10	45.45%		0.00%	1	4.55%		0.00%	11	50.00%
05/04/00	62	39	62.90%		0.00%	3	4.84%		0.00%	42	67.74%
05/05/00	80	39	48.75%	5	6.25%	2	2.50%	1	1.25%	47	58.75%
05/08/00	36	22	61.11%		0.00%	1	2.78%		0.00%	23	63.89%
05/09/00	62	33	53.23%	1	1.61%	1	1.61%	1	1.61%	36	58.06%
05/10/00	40	23	57.50%		0.00%	1	2.50%	1	2.50%	25	62.50%
05/11/00	40	22	55.00%	1	2.50%	2	5.00%		0.00%	25	62.50%
05/12/00	35	22	62.86%		0.00%		0.00%		0.00%	22	62.86%
05/15/00	40	11	27.50%	2	5.00%	2	5.00%		0.00%	15	37.50%
05/16/00	169	95	56.21%	4	2.37%	1	0.59%	1	0.59%	101	59.76%
05/17/00	146	90	61.64%	6	4.11%		0.00%	1	0.68%	97	66.44%
05/18/00	33	28	84.85%		0.00%		0.00%		0.00%	28	84.85%
05/19/00	16	10	62.50%	3	18.75%		0.00%		0.00%	13	81.25%
Totals	2130	1209	56.76%	153	7.18%	70	3.29%	21	0.99%	1453	68.22%

Appendix B. Table 8. PIT-tagged wild steelhead trout interrogations at Lower Granite (GRJ), Little Goose (GOJ), Lower Monumental (LMJ), and McNary (MCJ) dams from the Salmon River Trap, 2000.

Date	Number Tagged	Ints GRJ	% GRJ	Ints GOJ	% GOJ	Ints LMJ	% LMJ	Ints MCJ	% MCJ	Grand Total Ints	Total % Obs.
04/04/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
04/06/00	2		0.00%	1	50.00%		0.00%		0.00%	1	50.00%
04/07/00	4		0.00%	2	50.00%		0.00%		0.00%	2	50.00%
04/11/00	3	1	33.33%		0.00%	2	66.67%		0.00%	3	100.00%
04/12/00	4		0.00%	1	25.00%		0.00%		0.00%	1	25.00%
04/13/00	10	1	10.00%	1	10.00%	1	10.00%		0.00%	3	30.00%
04/14/00	6	2	33.33%		0.00%		0.00%		0.00%	2	33.33%
04/17/00	10	5	50.00%	4	40.00%		0.00%		0.00%	9	90.00%
04/18/00	14	9	64.29%	4	28.57%		0.00%		0.00%	13	92.86%
04/19/00	45	18	40.00%	5	11.11%	5	11.11%		0.00%	28	62.22%
04/20/00	14	4	28.57%	4	28.57%	2	14.29%	2	14.29%	12	85.71%
04/21/00	15	7	46.67%	6	40.00%		0.00%		0.00%	13	86.67%
04/24/00	10	4	40.00%	3	30.00%	1	10.00%	1	10.00%	9	90.00%
04/25/00	26	13	50.00%	7	26.92%		0.00%		0.00%	20	76.92%
04/26/00	10	6	60.00%	3	30.00%		0.00%		0.00%	9	90.00%
04/27/00	13	5	38.46%	2	15.38%	1	7.69%		0.00%	8	61.54%
04/28/00	8	6	75.00%		0.00%		0.00%		0.00%	6	75.00%
05/01/00	11	5	45.45%	2	18.18%	2	18.18%		0.00%	9	81.82%
05/02/00	7	6	85.71%	1	14.29%		0.00%		0.00%	7	100.00%
05/03/00	4	3	75.00%		0.00%		0.00%		0.00%	3	75.00%
05/04/00	16	9	56.25%	1	6.25%		0.00%	1	6.25%	11	68.75%
05/05/00	10	4	40.00%	1	10.00%		0.00%		0.00%	5	50.00%
05/08/00	5	3	60.00%		0.00%	1	20.00%		0.00%	4	80.00%
05/09/00	7	4	57.14%		0.00%		0.00%		0.00%	4	57.14%
05/10/00	3		0.00%		0.00%		0.00%		0.00%	0	0.00%
05/11/00	8	2	25.00%		0.00%		0.00%		0.00%	2	25.00%
05/12/00	7	4	57.14%	1	14.29%		0.00%		0.00%	5	71.43%
05/15/00	12	4	33.33%		0.00%	1	8.33%		0.00%	5	41.67%
05/16/00	22	5	22.73%	2	9.09%	2	9.09%	1	4.55%	10	45.45%
05/17/00	19	8	42.11%	2	10.53%		0.00%		0.00%	10	52.63%
05/18/00	6	2	33.33%	2	33.33%		0.00%		0.00%	4	66.67%
05/19/00	3	1	33.33%	1	33.33%		0.00%		0.00%	2	66.67%
05/22/00	1		0.00%		0.00%		0.00%		0.00%	0	0.00%
Totals	336	141	41.96%	56	16.67%	18	5.36%	5	1.49%	220	65.48%

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